COMPUTERWORLD

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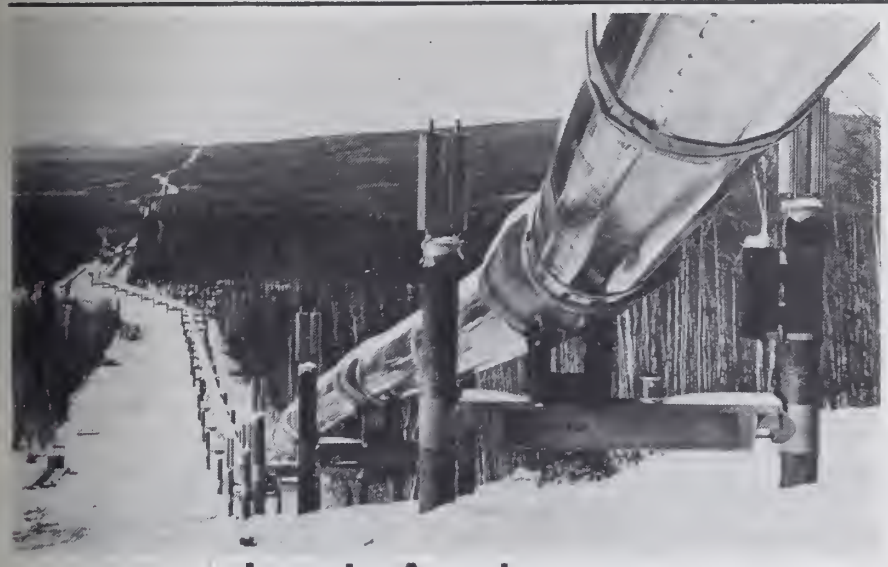


Look Again . . .

This is not a downhill racing course — it's the Alaska pipeline, and several very cold computer maintenance engineers are doing their best to keep the oil running. Who *are* these people? See story on Page 5.

Package for IBM Sites Aids Program Integrity

By Don Leavitt
CW Staff

TULSA, Okla. — Management and security of executable program libraries have been problems for most IBM installations, but Panexec, just introduced by Pansophic Systems, Inc., copes with both problems very effectively, according to a spokesman for the Bank of Oklahoma, where the software has been in place since last summer.

Executable program libraries are made up of programs ready for use on the computer. They are the output of the link-edit step, which uses as input object code created by the user's compiler.

Although software has been available previously to manage both source and object code — Pansophic's Panvalet or Applied Data Research, Inc.'s The Librarian, for example — Panexec is the first package to work with IBM 360/370-based programs after they have been link-edited, a Pansophic spokesman claimed.

Major features of Panexec are a multilevel password security system, cross-reference reporting between source and executable modules, executable library utilities, a management report-generating facility and DASD error handling, he said.

Tight Security

As many as five levels of security codes can be applied to groups and elements in an executable program library under Panexec control. In addition, the system flags attempted security violations in such a way that, once such an attempt occurs, only a designated security administrator can unlock the system, the company explained.

The cross-referencing is extremely useful to programmers, according to Pansophic, since it documents which source listing is involved when a problem occurs with an executable program. No time is lost trying to solve the problem with an out-of-date listing, the spokesman said.

The library utilities, interchangeable with IBM's, reduce the initiation/-termination process so users can compile, link and go in one step. And work files, normally allocated separately for each module being compiled, need only be allocated once under Panexec, he added.

The management reporting facility accumulates and reports use data on Panexec library reorganization. This capability is built around a limited version of Pansophic's Easytrieve report writer that is embedded in Panexec, the

(Continued on Page 6)

HIS Adds 'DPS' to Level 66 Line

By Frank Vaughan
And Don Leavitt
CW Staff

WALTHAM, Mass. — Honeywell Information Systems, Inc. has introduced the Level 66/Distributed Processing System (66/DPS), which it claimed "roughly covers" the IBM 3031, 3032 and 3033 in performance.

The system has five levels of performance, HIS said, adding that the system does not replace the troubled Level 66/85, with which it is "still going ahead."

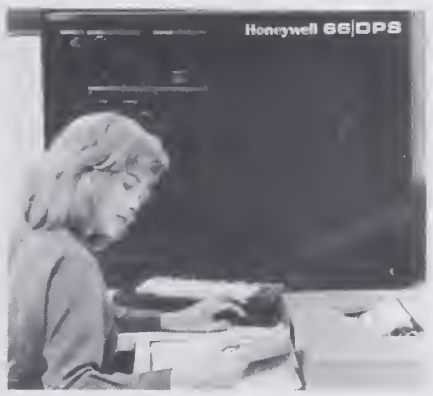
The lowest performance level of the 66/DPS is comparable in processing power to the current 66/60 system, HIS said. Performance Level 2 provides an additional 55% in processing performance, while Level 3 provides an additional 35% over Level 2.

The fourth level adds another 60%, while the fifth and most powerful level adds still another 35%, making it about 450% more powerful than the entry-level machine. A fully enhanced Level 5 system provides 120% of the processor performance of a four-processor Level 66/80, the firm said.

The lowest three levels are powered by twin processors within a single cabinet. The fourth power level has a third processor, in two cabinets, and the top performance model includes yet another companion processor, making four processors in three cabinets.

Cycle time for cache operations on the systems is 100 nsec, HIS said, adding that the effective cycle time is therefore 50 nsec because of the companion processors. The memory access

(Continued on Page 8)



Level 66/DPS

Turnkeys Built on Series/1 Provide 3270 Emulation

By Ronald A. Frank
CW Staff

NEW YORK — DDP Products, Inc. has announced four levels of IBM Series/1 systems that provide 3270 emulation mode for IBM and non-IBM terminals.

The minicomputer-based turnkey systems will operate in networks configured for binary synchronous communications or Synchronous Data Link Control (SDLC). They are reportedly aimed at users who require a 3270-type network but need more upgrade options.

Called the System 100, 101, 102 and 103, the configurations start with a basic system that includes four CRTs, a Series/1 processor with 32K of storage and a typical communications link under Bisynch or SDLC to a 3705. This basic configuration, the System 100, costs about $35,000 installed.

A System 101, which adds diskette storage capability and support for up to 16 CRTs, costs about $60,000, depending on options, DDP Products said.

The System 102 supports 32 CRTs and has both diskette and disk storage at a price of about $80,000; the System 103 has multiple disk subsystems, line

(Continued on Page 6)

Documation Has Substitute For IBM 3211/3811 Printer

By Frank Vaughan
CW Staff

MELBOURNE, Fla. — A microprocessor-controlled 3,000 line/min impact line printer/controller that is plug-compatible with the IBM 3211/3811 printer/controller has been introduced by Documation, Inc.

The Documation Impact 3000 is reportedly 50% faster and, at $90,000, $13,000 less costly than the IBM unit, which comes with a 3216 Interchangeable Train Cartridge. The IBM unit is used with most major IBM 360/370 mainframes.

The Impact 3000 controller is currently optimized for 50 nsec cycle time, resulting in an average instruction time of 350 nsec, according to Documation.

The Impact 3000 provides separate program and memory data address space, enabling the processor fetch cycle to occur during the execute cycle. This contributes to the overall speed of the unit, a spokesman noted.

An additional speed advantage is ob-

(Continued on Page 8)

Midwest DPers Not Flustered By Bad Weather

By Ann Dooley
CW Staff

Neither rain, sleet nor the worst blizzard in one state's history kept DPers from their appointed tasks after 18 to 24 inches of snow fell in the Midwest two weeks ago.

Many installations in Ohio, Michigan, Indiana and other snow-struck states were forced to close down the day of the snowfall, but they were up and running again the next day. Most

(Continued on Page 2)

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Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800. Telex: USA-92-2529

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In Unusual Abundance

Write-Ins Join ACM Election Slate

By Ann Dooley
CW Staff

NEW YORK — Several members of the Association for Computing Machinery (ACM) are writing themselves in as petition candidates in the associations's 1978 election because they are unhappy with the ACM nominating committee's selections.

Some members claim the nominating committee did not give enough time and attention to their choices and as a result, came up with a slate unrepresentative of the ACM membership. Others claim that president Herbert Grosch "stacked the deck" by appointing two of the three members of the nominating committee and thus assuring nominees of his liking.

In any case, there are more write-in candidates running than in recent years — spurred by dissatisfaction over the official choices or possibly by the success of Grosch's petition campaign in the last ACM election, one ACM member commented.

Petition candidate Peter J. Denning of Purdue University is challenging committee-selected candidates John Gosden, Equitable Life Assurance Society of the U.S., and John W. Hamblen, University of Missouri at Rolla, for the position of ACM vice-president.

Challenger David H. Brandin of SRI International is a petition candidate for the office of secretary. Committee-selected candidates for that office are Richard E. Nance of Virginia Polytechnic Institute and Marshall C. Yovits of Ohio State University.

Three petition candidates have entered the running to become members-at-large. Those challengers are Gerald Salton, Cornell University; Robert Ashenhurst, University of Chicago; and Jeffrey Ullman, Princeton University. They are competing with Charles Bradshaw, Vanderbilt University; David H. Brandin; C. William Gear, University of Illinois at Urbana; Portia Isaacson, The Micro Store; Bruce Van Atta, University of Rochester; and Seymour J. Wolfson, Wayne State University.

Only three out of these nine candidates will be elected.

Petition Procedure

A petition candidate needs to obtain signatures from 1%, or 253 of the members eligible to vote in ACM elections.

All of the candidate's petitions are in the process of being verified, an ACM spokeswoman explained.

No one has filed a petition to compete for the ACM presidency against nominating committee selections Aaron Finerman, State University of New York; and Daniel D. McCracken, current vice-president.

In addition, there have been no challenges to the committee's selections for regional representatives. For the North Central region, candidates are Barry Bateman of Southern Illinois University and Earl C. Joseph of Univac.

Committee selections for the Northeast region are P. Bruce Berra of Syracuse University and Monroe M. Newborn of McGill University.

H. Donald Barnhart, Boeing Corp. Services Co., and Fred N. Brand, Lockheed Missiles and Space Co., were selected for the Pacific region, while Della T. Bonnette of the University of Southwestern Louisiana and Robert R. Korfhage of Southern Methodist University were selected for the South Central regional by the ACM committee.

Only one candidate will be elected from each region.

Nominating committee members are Olin Johnson, chairman, George Glaser and Alex Hoffman.

All petitions must be turned in to ACM headquarters by Feb. 28. Ballots will be sent out to ACM members in April and will be counted the end of May. New officers will begin their terms July 1.

Snow Doesn't Scare DPers

(Continued from Page 1)

are already back on their regular schedules after several days of working hard to catch up, users said.

"We had to slow down, but were able to keep functioning," Gene Brachman, operations manager for Dayco in Dayton, Ohio, said. "Our computer operator stayed in a hotel across the road, so we were able to keep in constant touch."

Some IBM field engineers also stayed on the job around the clock — not so much out of loyalty, but simply because they couldn't move their cars and were forced to spend the night at a customer's installation.

The problems of these Midwestern users might have just begun, however, if the United Mine Workers strike is not ended soon. New supplies of coal are needed to bolster the dwindling supply soaked by the snow.

Ohio Gov. James Rhodes ordered all state offices to reduce electrical consumption by 25% and cut the voltage power to all businesses by 5%. Most utilities have coal reserves for about 50 days and "a lot of people are pretty worried" about what will happen after that, Roy Reeves of Ohio State University in Columbus said.

If it gets much worse, "we'll tell everyone to go home and leave the computers running," according to Bradley Kirk, vice-president of systems and development for Nationwide Insurance Companies of Columbus.

If the strike is not settled within two weeks, electricity will be cut 50% to stretch remaining coal supplies and to maintain "human needs" services, Rhodes said. Such cutbacks would cause layoffs of 500,000 to 750,000 workers and force many places to close, he predicted.

Two to four inches of new snow was predicted for Ohio last week, but "that would be peanuts compared to what we've had," Dayco's Brachman said.

On the Inside This Week

NEWS
Selection of Antitrust Juries Called 'Abysmal' 4
To Some DPers, Cold and Darkness a Way of Life . . 5
Two Charged in Theft of Time From Nasa System . . 6
SSA Swapping Data With VA, Railroad Board 7
Cbema Asks U.S. Meet on Proposed I/O Fips 9
U.S. Stand on Data Flow Seen Months Away 10
IEEE Head Sees No Easy Answer to Itar Protest . . . 11

EDITORIAL
Editorial: Must Be a Better Way 16
Human Connection: Empathy Needed First 17
Taylor Report: Problems in Two-Field Lines 17
Security Function No Longer Expendable 18
Data on CPU Life More Useful as Graph 19

SOFTWARE & SERVICES
DOS/VS Shops Going to On-Line Work 23
Package Handles Accounts Receivable On-Line . . 24
Sigplan Meeting to Trace Languages' Growth 25
Once for Designers, DBMS Now Keyed to User . . . 26
Planning the Key to Easy DOS-OS Conversion. . . . 27

COMMUNICATIONS
Firm Uses Device to Cut Satellite Delay. 29
GE Teleprinter Operates to 1,200 Bit/Sec 32
Notion Firm Alters Order, Inventory System 36
ATL Has Terminals for Short Term 38
Teletype 40, CPUs Linked 38

SYSTEMS & PERIPHERALS
COM Receives Boost From Two Sides 39
Data Entry User Likes Revolutionary Evolution 41
Mass Storage Facility Built for Xerox Systems 42
Add-On-Memory Gives Clinic Flexibility 44

MINIWORLD
BC/7 Gets Multiprogramming, Diskette. 45
Pharmacy Cuts Losses via Time-Sharing Mini 47
Manufacturer Heightens Accounting Accuracy. . . . 49
Dual Systems Meet Newspaper's Backup Need . . . 54

MICROCOMPUTING
Heath H8 Users Get Floppy, Upgrade to Z-80. 55
Floppy Disk Controller Fits 8010 58

COMPUTER INDUSTRY
IBM's Share of Federal Pie Shrinking 59
IBM Moves Hurt PCM Finances: Broker 59
Dealer Predicts 'Bloodbath' for 370 Lessors 61
Japanese DP Not the Dragon It Appears. 62
Microprocessor Features Clock Oscillator 63

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Selection of Antitrust Juries Called 'Abysmal'

By Molly Upton
CW Staff

LOS ANGELES — The jury selection process for antitrust trials is "abysmal," according to Dr. Donald Vinson, associate professor of business administration at the University of Southern California.

Vinson, a sociologist who supervised the shadow jury experiment for IBM in the California Computer Products, Inc. vs, IBM antitrust trial [CW, Jan. 31, 1977], also cited some of the strong and weak points of Calcomp's presentation to the jury.

Disagreeing with the lenient policy some judges adopted when selecting an antitrust jury, Vinson said the current procedure does not produce a cross-section of the population. One cannot say that one is being judged by one's peers, he said.

Juries consist largely of older or retired people, many of whom have "little or no experience with business and/or data processing. They have a tremendous naivete concerning computers, and many are opposed to computers to start with," he added.

Excuses for 'Extreme Hardship'

Prospective jurors should only be excused for reasons of extreme hardship such as health. They should not be excused just because serving on a jury for a lengthy period of time would inconvenience them, Vinson said.

Many prospective jurors argue that serving on a jury would present an economic hardship because their regular salaries are above the per diem rate paid to jurors, he pointed out. However, Vinson argued, there is no reason professionals should not serve on juries and, in fact, they are probably better able than others to survive the temporary reduction in pay.

Vinson would like to see some jurors with background or knowledge of the industry or the equipment. "I don't see why people have to be totally ignorant of the industry," he commented.

Being a juror in an antitrust trial is difficult because the evidence is of a technical nature and the issues are complex. Vinson suspects that juries in criminal trials "are a bit more fair because they can all relate to interpersonal affairs."

Criminal attorneys have an advantage over antitrust attorneys, he said, in that they have developed a second sense on how to act before a jury. But antitrust attorneys are rarely before a jury, he said, and often they are so involved in the case they forget about the impact their behavior can have on jurors.

Jurors Watch Lawyers

In the Calcomp case, jurors began to judge the importance of the testimony in relation to reactions of the lawyers, Vinsom said.

For instance, if an attorney seemed calm, the jurors were likely to think he felt the testimony was going well for his client. But if an attorney appeared upset, then the jurors often suspected the testimony was tending against what he wanted and would listen more keenly to the witness, he explained.

Although Vinson concluded that the jury in the Calcomp case would have decided in IBM's favor, he is convinced that IBM faces an uphill battle in jury trials because of its size and reputation as a firm with immense resources.

Attorneys for IBM have a double duty: to present their side of the case and to try to neutralize those attitudes or change negative views to positive, Vinson said. And changing attitudes is difficult, he added.

After the cases's opening segments, the jurors concluded the case involved the "big" vs. "small," he said.

During the trial, there were peaks and valleys during which the shadow jurors would swing back and forth, but Calcomp steadily gained in their favor until the very end, when former Calcomp president Lester Kilpatrick took the stand, according to Vinson.

"The last three days were the turning point," he said. Kilpatrick's answers were verbose and it became evident that he had made a fair sum of money while competing against IBM. This factor tended to diminish the impression of big vs. small that had been established at the outset, he said.

Although both parties made an effort to educate the jurors about data processing, Vincent said the attempt amounted to a sensory overload.

Rather than cramming everything into jurors' heads at once, Vincent suggested having a preliminary introduction with a one-hour overview and product display, and then later, after they have heard the terms used in the courtroom, having another teaching session.

Most of the jurors in the Calcomp case were bored to death and horribly confused by the education effort, he said.

In the Calcomp case, the jurors were fond of both attorneys, Vinson said. They noticed what Calcomp's attorney, Maxwell M. Blecher, wore and were mentally puzzled by the navy blue "uniform" of David Boies, the attorney from Cravath, Swaine & Moore representing IBM.

Blecher had a real rapport with the jury and several felt badly for him when the case received a directed verdict, Vinson observed.

He said that Boies impressed the jurors as being a very bright person with a limitless facility for facts.

Memorex Jury Picked Fast — After All That Research

SAN FRANCISCO — Although both Memorex Corp. and IBM attorneys attempted to research the backgrounds of prospective jurors in the antitrust suit between them [CW, Jan. 23] the jury was selected so quickly that it is unlikely much of this groundwork was useful, according to courtroom observers here.

Lead attorney for Memorex, John Endicott of Gibson, Dunn & Crutcher, repeatedly suggested the court adjourn for lunch before jury selection was completed, but Judge Samuel Conti seemed determined to select the jury as quickly as possible.

By the first day of testimony, both alternates had assumed seats on the 12-member panel after two designated jurors indicated inability to serve. Judge Conti remarked "at this rate, we have 12 more days to go." The parties have agreed that a jury of less than 12 persons is acceptable.

The six-man, six-woman panel includes four women who do not work outside their homes and two who generally hold full-time jobs.

One man is retired and two have held their jobs for more than 15 years.

Occupations of the jurors include secretary, collection agent, maintenance engineer for a school district, mail services supervisor at a university, bus fueler and materials segregator for the Defense Supply Agency. One young man installs central office telephone equipment and was the only one indicating any knowledge of how computers function.

As in the California Computer Products, Inc. vs. IBM case, the parties appeared to reject any prospective juror who had some entrepreneurial business experience or supervisory background in a large firm.

Intent on Understanding

Thus far, at least some members of the jury have indicated a keen intent to speak up if they do not understand something.

For instance, during the show-and-tell tour of IBM's marketing office where various machines were installed, including some non-IBM gear, one juror made sure she got a good second look at the inside of one of the disk drives mentioned in the suit.

The jury also seems to be giving the attorneys lessons in how to cope with all their visual displays, indicating to them when an easel is blocking their view of the screen.

Although Judge Conti has emphasized to the jurors that the trial could last as long as 10 months, he has repeatedly told attorneys to plan on no more than three months.

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Correction

In "EFT Systems? No Thanks, Not Yet" [CW, Jan. 9], a large New York City bank in which an act of computer fraud occurred was incorrectly identified as the Dime Savings Bank of New York. The incident discussed occurred at another bank with a similar name.

At Least in Valdez, Alaska

To Some DPers, Cold and Dark a Way of Life

By Ann Dooley
CW Staff

VALDEZ, Alaska — Wanted: computer maintenance engineer to work long hours in arctic weather conditions; position involves travel and working without sunlight.

Conditions such as these might not appeal to the average computer engineer, but six Honeywell volunteers recently decided to get away from the same old grind — and did they ever.

Working 10 hours a day, six days a week, sometimes in darkness and sometimes in weather that drops to -80° F, the group is monitoring the computer system on the Alaska pipeline.

Most seem to enjoy the work, although none of them or their families had lived in such conditions before, according to William Kersten, project manager. "They knew they were getting into something, but they didn't know quite what," he commented.

Of the six maintenance engineers on the project, four are stationed here at Valdez and two at Fairbanks. Kersten spends most of his time now in California, but visits the two sites regularly.

Valdez, population 3,500, has only one road in and out of the town; it is surrounded on all sides by mountains that reach 5,000 feet. Planes flying into Valdez often turn around because the pilots are unable to see through the narrow gaps between the mountains well enough to land.

Anchorage, the nearest large city, is eight hours away; it was almost unreachable last winter because of the 31-1/2 feet of snow that fell. "The isolation gets to everybody," Kersten said.

Typical Day

What is a typical 10-hour work day? "You get up and go to work, come home to eat and go to bed," Kersten said. "You know it's not going to last forever, so you put up with it."

The group arrived last March. Its job is making sure the systems controlling the flow of oil from Alaska's North Slope to the oil terminal at the southern port of Valdez operate reliably.

The systems, specially designed by Harris Corp., are based on dual Xerox 530 CPUs. Honeywell's Field Engineering Division agreed to provide maintenance under a two-year contract it signed with Xerox.

The six engineers service the equipment and do preventive and emergency maintenance. It's fairly typical work, according to Kersten.

The 12 remote terminals located at the 12 pump stations along the pipeline transmit data to the main computer system, which is called the Backbone Supervisory System, via microwave relay towers or satellite. The system transmits about 200 data signals and 1,400 status and alarm signals by polling the 12 terminals every 10 seconds.

Any of the information can be displayed on the CRTs located on the pipeline controller's console. All alarm signals are automatically printed on a General Electric terminal logger.

The engineers are on call 24 hours a day on a rotating basis. They must drive trucks or sometimes fly to a remote pump station to check on equipment or make necessary repairs.

Getting to those stations can be a pretty rigorous task, Kersten said, since they are strung out over 800 miles and Pump Station One is a 12-hour drive from Valdez.

The engineers went through a cold weather survival course when they first arrived. Luckily, there haven't been any emergencies so far, Kersten said. "There are certain rules to abide by, like telling someone where you're going and when you leave," he added.

There are radios in the cars; if anything happens on the way to a pump station, an engineer can call for help. Arctic clothing and survival gear, such as a sleeping bag and dried food are also provided.

Little to Do

Although the 10-hour days keep people pretty busy, there isn't much entertainment around, according to Kersten. Valdez has no movies, bowling allies or television unless a person pays $30 a month for a TV hook-up.

When people get together, they usually play cards or go snowmobiling, Kersten said, noting Valdez just built a million-dollar high school with the profits from the pipeline and the school swimming pool is available.

One problem is the long nights in Valdez. Last Dec. 21, it was dark at 9:30 a.m. and stayed dark until 2:30 p.m. the next day. "You get up in the dark and go home in the dark and don't see the sun for weeks," Kersten said.

In the summer, it's the opposite. The sun is up until 1:30 in the morning and people have to learn how to sleep with it. During that time of year, the biggest selling item in Valdez is black-out curtains, Kersten said.

While none of the eningeers has definitely said he is going to reenlist for another two-year stint, no one has said he won't, Kersten said.

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COMPUTER ASSOCIATES

Front End of Illiac 4

Two Charged in Theft of Nasa System Time

By Nancy French
CW Staff

SAN FRANCISCO — A federal grand jury here has charged two men with conspiracy and theft of government property in connection with the unauthorized use of a computer system owned by the National Aeronautics and Space Administration's (Nasa) Ames Research installation at nearby Moffit Field.

Although early reports estimated that the stolen computer time was worth "possibly millions of dollars" and that the giant Illiac 4 system here was involved, those reports were vastly exaggerated, according to Marcelline Smith, director of Nasa's Institute for Advanced Computation.

The time, now valued at about $2,000 at commercial rates, was stolen from a Digital Equipment Corp. PDP-10 system used as a front end to the Illiac, Smith said.

"The Illiac, which is just a very high-speed processor with no I/O of its own, has a PDP-10 front end to handle I/O functions as well as data management and interactive use," she explained. The PDP-10 was the only part of the huge custom-made scientific mainframe that was used in the scheme.

Those charged were David Sampson, 28, a Sunnyvale resident, and Gary Miller, 30, of Redwood City, both employees at one time or another of Acts, Inc., a firm with which the research installation had a maintenance contact.

Sampson, who was no longer employed at Ames at the time the fraud was discovered, had been responsible for maintenance of the PDP-10. Miller, who is still employed by Acts, maintained the installation's computer terminals, according to Smith.

The theft came to light in March of last year during "a routine review and purge exercise," Smith said. At that time, one of the supervisors noticed several directories were still in active use, even though the individuals to whom they had been assigned had left the organization.

That in itself was not unusual, Smith said, because in developmental projects like the ones carried on here people often benefit from occasional access to work done by previous employees. However, when the supervisor reviewed the data in those files, he found information pertaining to the formation of an electronics manufacturing company, she said.

The evidence was turned over to a Nasa inspection officer for further investigation.

The theft did not end here, however. Several pieces of missing gear — which Smith described as terminals and oscilloscopes worth $8,000 — were discovered in a dumpster behind a nearby tavern. Mountainview police traced the serial numbers on the discarded equipment back to Ames and then to Sampson, she said.

Miller was suspended temporarily without pay, but since he has not been connected with the equipment theft, he has been reinstated, according to Smith. Only Sampson will face charges for theft of the equipment.

Although the trial date has not yet been set, according to U.S. Assistant Attorney Edward Davis, the case will be heard in the Federal District Court for the Northern District of California by Judge William A. Ingram.

Series/1 Used in Turnkeys

(Continued from Page 1)

printers, etc., and costs "under $150,000," a spokesman said.

Each of the systems includes a DDP Products real-time multitasking operating system for the Series/1. Called OS/1, the operating system is "plug-compatible software" that allows for upgrades, according to the spokesman.

The system software includes terminal control programs and device control programs, a host link with a data manager and other necessary communications support software.

The turnkey systems can support the IBM 4979 CRT in addition to CRT terminals from Hewlett-Packard Co., Bunker Ramo Corp., Applied Digital Data Systems, Inc teletypewriters and "most other message-oriented Ascii CRTs," the company said. The IBM 3600 finance system terminals can also be interfaced to these systems.

Upgrade Capability

The turnkey systems were designed to allow users who now have non-IBM terminals to keep them when upgrading to distributed terminal-based systems. The upgrade capabilities allow users to start with small 3270 emulation and build up to full distributed networks using Series/1 processors as local CPUs in transaction-oriented nets.

The DDP Products software makes non-IBM terminals look like conventional 3270 devices in a communications network and provides support for special-purpose banking and other terminals, he noted. Later versions of the turnkey systems will permit the use of the recently introduced Model 4987 programmable communications subsystem, he added.

The OS/1 operating system normally is supplied in object code format, but source code can be provided at a one-time charge of about $8,000, the spokesman said. OS/1 is available to existing Series/1 users at a cost of about $5,000.

First deliveries of the turnkey systems are scheduled for March; software support will be provided by DDP Products and hardware maintenance with be available from IBM. Users configuring multiple systems into a network will be able to get discounts, DDP Products said from 31 E. 28th St., New York, N.Y. 10016.

'Panexec' Boosts Integrity

(Continued from Page 1)

spokesman said.

The DASD error handling takes two forms. In the first place, "errors" of disk space overallocation are eliminated by the system's dynamic allocation procedures. Secondly, Panexec can recover from most permanent I/O errors; when an error is encountered, lost program names are printed, the track is flagged and the rest of the file is unaffected, Pansophic claimed.

Short Span to Debugs

At the Bank of Oklahoma, DP director Len Fears said program integrity was his primary reason for purchasing Panexec. He explained he had serious problems with programmers deleting good production program modules when modifications were being put into production.

Before Panexec, when a program "blew up", time was lost trying to determine what programs and what programmers were involved.

Fears also spoke highly of the dynamic allocation and compression features. He now has one library instead of four but, even more than that, he saves the four hours of "stand around" time the bank used to have. During that time, no one could access libraries being compressed with IBM's utilities.

That had been a "next-to-impossible" situation, he pointed out, since the bank's data center runs a 2M-byte IBM 360/65, employs 42 operations people, five technical support people and 28 application programmer/analysts.

Panexec is currently available for all OS environments; it will be released for DOS in June. The package can be leased starting at $500/mo depending on the operating system and size of the system to be managed.

Purchase plans are also available, Pansophic said from 709 Enterprise Drive, Oak Brook, Ill. 60521.

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IE INDUSTRIAL

SSA Swapping Data With VA, Railroad Board

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — The Social Security Administration (SSA) has been computing benefit payments for the blind and disabled using data from the Veterans Administration (VA) and the Railroad Retirement Board — a situation that has bred concern among members of Congress for the privacy of those individual records and the security safeguards accompanying this information exchange.

While only the VA and the Railroad Retirement Board currently provide benefit data to the SSA, the agency may begin to obtain similar information from the Civil Service Commission for Supplemental Security Income (SSI) payment calculations by April, according to a General Accounting Office (GAO) report recently released here.

"Social Security is also considering obtaining data from other federal benefit programs," the GAO report stated.

Although the GAO "fully identified the problems inherent in this information exchange," Capitol Hill sources contacted recently felt the agency failed to spell out any real solutions to the situation in the Nov. 15 report entitled "Privacy Issues and Supplemental Security Income Benefits," issued last month.

Moss Concerned

Rep. John E. Moss (D-Calif.) wrote to the GAO a year ago, asking the office to examine whether the SSA's reliance on the VA and the Railroad Retirement Board for accurate compensation and pension data was within the bounds of the Privacy Act of 1974.

Moss' concern grew out of a November 1976 GAO recommendation that the SSA collaborate with the VA and the Railroad Retirement Board for complete and timely benefit program income information because the SSA had been using inaccurate data to compute SSI payments.

The misinformation used to produce checks for the blind and disabled aided by SSI had resulted in annual overpayments of $60 million and underpayments of $4 million, the GAO noted. The office believed a data link between the three agencies would put an end to incorrect payments.

As a result of Moss' inquiries, the GAO thought again about its suggestion and recommended that the VA more fully inform the public about its disclosures to SSA and that the three agencies determine what security safeguards might be needed for the movement of data among them. The office supported the concept of other agencies sharing their data with SSA to aid in the administration of benefit programs, however.

Programs Cited

Among the programs from which the SSA is considering obtaining data are VA Education Assistance; Railroad Retirement Board Unemployment and Sickness Insurance; U.S. military retirement and, in the Department of Labor, Black Lung, the report stated.

The programs now sharing individual benefit data with the SSA are the Railroad Retirement Board's Survivor and Pensioner Benefit System and the VA's Veterans Dependents and Beneficiaries Compensation and Pension Records. Both programs, the GAO said, fall into the "routine use" category of the Privacy Act, which permits additional uses for individual records if those uses are compatible with the purpose for which the information was originally collected.

GAO's View

Citing laws governing the SSA, the VA and the Railroad Retirement Board in addition to the Privacy Act, the GAO concluded that a federal agency can provide the SSA with information from any system of records as long as the data helps the SSA to determine an individual's eligibility or benefit amount. The disclosure must also comply with the requirements for routine use described in the Privacy Act.

This conclusion has not been tested in the courts, the GAO said, but added the VA and the Railroad Retirement Board need not fear giving certain benefit data to SSA as long as they follow Privacy Act procedures.

The VA has 20 defined routine uses for the Veterans, Dependents and Beneficiary's Compensation and Pension Records program. It has identified three routine uses it believes permit its disclosure of benefit information to the SSA. Among these, one routine use allows "any person" who applies for a veteran's benefit record to get it.

The VA disagreed with the GAO that it should have to redraft its routine uses to provide specifically for SSI program disclosure. "Further restrictiveness is unnecessary," VA Administrator Max Cleland wrote to the GAO.

The VA fears a rewrite of the program's uses might prevent helpful sharing arrangements with other agencies.

Initially, at SSA's request, the VA furnished magnetic tape files of selected compensation and pension data on all veterans. The Railroad Retirement Board furnished its entire pension record to the SSA, the GAO said.

While most of this information was needed by the SSA at the onset of the data exchange to verify the accuracy and completeness of SSI payments "Social Security should consider developing a mechanism for obtaining information only on SSI recipients

(Continued on Page 15)

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Printer Replaces IBM 3211/3811

(Continued from Page 1)

tained since all 32 processor registers can be used as accumulators, he added.

To prevent the data transfer rate from affecting the throughput, the processor loads the data from the printer interface, tests it for validity and sets up the hammer fire buffers prior to printing each line. With a channel throughput rate of 70K byte/sec, less than 5 msec is required for line loading and associated housekeeping, the spokesman claimed.

Since the 5 msec occurs during paper motion, printer throughput is unaffected, he said.

The Impact 3000 received its speed rating while operating on a 132-print position line at either 6- or 8-line/in. using a 48-character set, the firm noted. A 150-print position line is optional.

Printing is accomplished when a hammer strikes the paper from behind and forces the paper and ribbon into contact with a character on the 432-character print band. With a band speed of 489 in./sec, a different character will line up with each hammer every 272 msec, the spokesman explained.

Because of this, each hammer location must be tested to determine if the character that is supposed to be printed will be the next one to pass. This is accomplished by comparing each location of the 150 character print line buffer with the associated character in the character set buffer (432 characters), a buffer whose character set changes in synchronism with the band motion, Documation said.

If the two characters match, the forms control buffer (256 characters by 9 bits) is accessed to determine if the hammer has already been fired. If not, it is fired and the flag is loaded into the memory.

The unit has a high-speed slew rate, according to the spokesman. For skips up to seven lines, the unit slews at 35 in./sec. The rate increases to 100 in./sec. for skips beyond seven lines and up to 51 lines at 67 line/in. or 66 lines at 8 line/in.

Other features of the Impact 3000, available on lease as well as by purchase, include off-line fault locating and hardware timing diagnostics; operator-adjustable power stacker for multipart forms; power-operated hood; and operator-controlled print density and character phasing adjustments.

Documation can be reached at P.O. Box 1240, Melbourne, Fla. 32901.

Documation Printer

HIS Adds Multilevel System to Its 66 Line

(Continued from Page 1)

time is 94 nsec/byte.

The system "is designed to provide users with increased performance and the flexible central system configurations required for communications-intensive applications," a spokesman suggested.

A 66/DPS at the base level includes the twin processors, a single systems control unit, an I/O multiplexer and 1M byte of 4K MOS main memory. The systems control unit is the interface between the CPUs and the I/O multiplexer, the spokesman noted.

The I/O multiplexer is configured with 35 board slots, which if fully utilized would provide a user with as few as 11 channels or as many as 35, the spokesman noted. Different peripherals require different numbers of slots, he noted. A high-speed card punch requires three slots and a data communication processor requires but one slot, for example.

An expansion option for the multiplexer adds an additional 19 board slots, or a second I/O multiplexer would provide 70 slots, offering the user some possible redundancy through plugging some items into both multiplexers, he explained.

Each 66/DPS also consists of a 64K-byte Level 6 minicomputer-based integrated network processor (INP) that accepts up to 96 communications lines. The INP can have its communications processing power increased as much as seven times through the installation of three INP modules and four performance options.

Software Requirements

The DPS environment requires a special version of the Generalized Comprehensive Operating System (Gcos) to control the multiple processors, but the basic capabilities of the software remain much as they are now.

The minis that act as INPs for the 66/DPS require an enhanced version of the General Remote Terminal Supervisor (GRTS/II) or — for more sophisticated operations — the Network Processing Supervisor (NPS) as operating systems, since they are outside of Gcos control.

GRTS/II has twice the speed and performance of GRTS, but otherwise has functional compatibility with it. It also supports easier addition of "stranger" or non-HIS terminals to the system, and a network processor link allows file exchange between two hosts, according to a spokesman.

NPS is needed primarily for message-switching, since GRTS/II does not support that activity. NPS also handles message logging and would be used by installations requiring more sophisticated networking applications than are possible under GRTS/II, the spokesman explained.

GRTS/II costs $210/mo while NPS is available for $890/mo. Support for the optional High-Level Data Link Control (HDLC) interface costs an additional $90/mo with either system, HIS said.

DM-IV Supported

Data Management IV (DM-IV), introduced early last year, is fully supported under DPS. This package combined a version of the firm's Integrated Data Store (IDS/II) data base manager with a transaction processor, a query and reporting processor (QRP) and a procedural language processor (PLP).

Each of these subsystems is separately priced, ranging from $255/mo for PLP and $360 for QRP, to $893 for the data manager and $1,134/mo for the transaction processor, the spokesman noted.

A data base-oriented Fortran has facilities allowing it to interface with IDS/II, while a PL/I compiler/runtime system for DPS is said to outperform HIS's current software for the Level 66. The PL/I package costs $250/mo; no price was given for the Fortran compiler.

Upgrade Option

Level 66 users who have purchased their central systems and Series 6000 users who have purchased a "functionality option" can be upgraded to 66/DPS performance levels, the spokesman noted.

Main memory can be added in increments of 512K bytes to the 2M-byte level, then in 1M-byte levels to an 8M-byte maximum, he said.

A base-level 66/DPS costs $957,215 with a monthly maintenance fee of $3,350. The system is available on a 5-year lease for $23,405/mo. Additional memory costs $110,000 per 1M byte, while a full-performance INP sells for an additional $358,450. A Level 5 system costs $2,885,495, with a $7,941 monthly maintenance charge. The system leases for $64,175/mo.

The I/O multiplexer expansion option costs $53,855 and leases for $1,056/mo. A second one sells for $175,055 and leases for $3,249/mo.

Dartmouth Gets New Head of DP

HANOVER, N.H. — William Y. Arms, a lecturer in computing at Open University, England, has been named director of the Kiewit Computation Center at Dartmouth College.

Arms, who will replace John S. McGeachie, is expected to assume his duties here in mid-March. McGeachie resigned in June to accept a position with Automatic Data Processing, Inc., in Clifton, N.J.

Thomas E. Byrne, assisting director of computing services, has been acting director of Kiewit since July 1.

Oxford Graduate

Arms, a 1966 graduate of Balliol College, Oxford University, with a B.A. in mathematics, earned his Ph.D. from Sussex University in 1973. His doctoral dissertation was "Interlibrary Lending and the Use of the Computer."

Arms was a visiting assistant professor in mathematics at Dartmouth during 1976-77.

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Cbema Asks U.S. to Meet on Draft I/O Fips

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C — The Computer and Business Equipment Manufacturers Association (Cbema) has asked Secretary of Commerce Juanita Kreps for a meeting to explain its opposition to the I/O channel-level interface proposed as a Federal Information Processing Standard (Fips).

Although the organization's officials wrote to the Secretary more than a month ago, Cbema has yet to hear from her office, a Cbema spokesman said.

Meanwhile, the X3T9 technical subcommittee within the American National Standards Institute (Ansi) has approved a draft I/O channel interface standard and sent to it the X3 Computers and Information Processing Committee for review. As a result of its first letter ballot, however, X3 members raised a number of questions about the draft. X3T9's responses to those questions will be considered at an X3 meeting this week in San Diego.

If those attending that meeting are satisfied with the responses, the X3 secretary will set up another letter ballot of the full membership. Two-thirds of the members must approve a draft before it is forwarded to Ansi for legal review and publication.

'Severely Damaging'

Echoing the beliefs of its mainframe members who find the proposed I/O interface standard technically obsolete, Cbema told Kreps the plan to adopt such a Fips will have "severely damaging consequences to the computer industry in the U.S. and to the U.S. government as a user of such equipment."

In asking Kreps for a meeting, Cbema noted it has been "unable to find anyone who will accept the responsibility for the overall economic and trade aspects of the adoption of such a standard."

The association has talked with the Administrator of the General Services Administration, Jay Solomon, and with the Office of the Special Trade Representative — both of whom referred Cbema to Kreps' office, the spokesman said.

Cbema's mainframe members object to the proposed standard because it was developed from a single IBM system in the mid-1960s and "major changes have taken place in the technology and architecture of systems" in the intervening years.

Not only will the marketplace not stand still, the adoption of the I/O interface as a Fips "would impose a severe economic hardship on the majority of competitive systems suppliers by making their current offerings noncompliant," Cbema has argued.

One Cbema member objects to the I/O interface, for example, because it limits a system's bus data rate to 1.5M bit/sec, although most commercially available large systems can handle 3M bit/sec, the spokesman stated.

Specifying I/O architecture will inhibit design innovation and initiative, Cbema said. The cost of altering systems to meet the requirements of a federal marketplace governed by the standard will cause many firms to leave this field to the Japanese, who adopted that I/O design for domestic use about six years ago.

X3's poll of its 50 members ended in a 28-14 vote for the I/O interface's adoption.

Under X3's rules, proposals winning less than two-thirds of the member's votes even if a simple majority favors them, cannot be forwarded to Ansi headquarters for final review and approval. Thirty-four X3 committee members must approve the suggested standard before its supporters have any hope of making it a standard.

The IBM user groups Guide and Share, Inc., were among those X3 members casting negative ballots.

The proposed standard "is based on obsolescent — if not obsolete — technology," Share said in comments accompanying its Ansi ballot.

Pro and Con Votes

Also objecting to the I/O channel-level interface as a standard were Burroughs Corp., Control Data Corp., Data General Corp., Digital Equipment Corp., Honeywell Information Systems, Inc., IBM, NCR Corp., Recognition Equipment, Inc., Univac, Xerox, the American Nuclear Society and the IEEE Computer Society.

Firms and associations favoring the proposal included California Computer Products, Inc., Datapoint Corp., Itel Corp., Olivetti, 3M Co., National Association for State Information Systems, the U.S. Department of Defense, the U.S. Department of Health, Education and Welfare, the Association of Computer Programmers and Analysts, the Computer & Communications Industry Association and the Data Processing Management Association.

How to increase productivity in a COBOL shop...for $25

When you think of it, the programming done in most COBOL shops is pretty haphazard. In general, programs are coded without ever being designed so they have no structure. Program documentation (if any) is likely to be incomprehensible. Few programs are coded in an understandable style. And testing and maintenance are often a shambles.

As you would expect, these practices are reflected in programmer productivity. In a study done in 1965, for example, the average COBOL programmer was shown to produce only 10 to 12 lines of tested code per day. What's worse, a study done in 1975 showed no improvement. In other words, we have been stuck for ten years at an incredibly low level of productivity.

Since the mid sixties, however, the techniques of structured programming have promised a way to improve productivity. In one experiment, for example, programmers who used structured programming produced from 35 to 65 tested lines of code per day. That's a 300 percent or more increase when compared with the results of unstructured projects. Another study showed an increase in productivity of 77 percent or more when the techniques of structured programming were used.

"Your book is by far the most readable and instructive book on structured programming that I've read—and I've read them all."

Unfortunately, few companies today are benefiting from structured programming. Only about one-fourth of the computer installations claim to be using the techniques of structured programming. And I know that many of these companies use the techniques far less than they would care to admit...and with results that they couldn't brag about. In short, though the theory promises much, no one yet has developed a practical method for applying the theory.

With this in mind, I'm happy to announce two books on structured programming that I think will have a major effect on programmer productivity. The first is a training textbook called *Structured Programming for the COBOL Programmer*. The second is a reference manual called *The Structured Programming Cookbook*. Both were developed by Paul Noll, who is a software specialist and training manager for a large company in San Francisco.

What the Textbook Does

Like other books on structured programming, Paul's textbook presents the theory behind the structured programming movement. Unlike other books, however, Paul's book presents a method for applying the theory that works...a method that is complete, logical, and practical.

Perhaps the major shortcoming of other books and courses on structured programming is the treatment of program design and documentation. In general, these subjects are either given academic treatment or are omitted altogether. In contrast, Paul gives specific guidelines for designing and documenting programs with the emphasis on practicality. As Paul says, "It's ridiculous to try to teach structured coding and testing without first teaching structured design and documentation."

In chapter 2, then, you'll learn how to design a structured program. You'll learn the four steps for creating structure charts...what modules should go at what level...six things to watch for when refining structure charts...and much more.

In chapter 3, you'll learn how to document the modules within the structure chart using HIPO documentation. Why HIPO? Because Paul feels it is the most effective form of documentation that is currently available and it is the one most likely to be around ten years from now. But Paul doesn't use the cumbersome IBM implementation of HIPO. Instead, he shows you how to use an efficient HIPO subset.

After you have mastered structured design and documentation, chapters 4, 5, and 6 show you how to use the other techniques of structured programming. These techniques include structured coding, top-down testing, structured walkthroughs, chief-programmer teams, and development support libraries.

What the Cookbook Does

One of the problems with training is that it too often isn't applied after the programmer returns to his job. That's why we created an easy-to-use reference book that will follow the programmer back to his desk.

Section 1 of this book is called Standards and Guidelines. It summarizes the principles of the text for each phase of program development. So if a programmer can't remember the six steps to follow when creating a HIPO diagram or how to use compound conditions in a COBOL IF statement, he can use the cookbook to refresh his memory in a hurry. From the manager's point of view, this section is an instant standards manual for a structured programming shop.

"Mr. Noll has written a straightforward, no-nonsense text which tackles head-on the problems of proper program design when writing a structured COBOL program."

Sections 2 and 3, however, are a more important aid to productivity. They present the complete solutions for four model programs. Since structured programming encourages you to develop similar programs in similar ways, this means that you won't have to develop each new program that you write from scratch. When Paul Noll develops an update program, for example, he finds that he can use the structure chart, some module documentation, and even some of the COBOL code from the model update program in the cookbook. Imagine how this can increase a programmer's productivity.

Our Unlimited Guarantee

Together, I think Paul Noll's text and cookbook can have a major effect on the productivity in a COBOL shop. In six chapters in the text, Paul presents a complete system for developing structured programs. In three sections in the cookbook, he has created a tool kit for the COBOL programmer. At $25 for the pair, you don't need much programmer improvement to justify this investment. And this could be the most important purchase you will make this year.

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U.S. Stand on Data Flow Seen Months Away

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — Several more months will pass before the U.S. establishes its position on the privacy and economic issues surrounding transnational data flows — the movement of personal, scientific and corporate information among countries — sources here believe.

Even then, initiatives for a national policy are more likely to come from Congress than the State Department, the sources said.

The State Department recently held the first meeting of its Advisory Committee on Transnational Enterprises' Subcommittee on International Data Flows, but the organization probably won't meet again until May or June, sources close to the department predicted.

Largely informational, this first meeting drew only four of the 35 Advisory Committee members, although 50 interested "members of the public" turned out to hear and participate in the subcommittee's discussions.

Search for a Sponsor

Meanwhile, a joint resolution that would direct President Carter to study the importance of international communications and the free flow of information and to establish a national policy regarding them is floating to establish a national policy regarding them is floating around the Senate side of Capitol Hill in search of sponsors.

Though addressing problems and promises beyond transborder data flows, the resolution includes these issues. If passed by the Senate and the House and signed by the President, it would require that an international information policy be implemented within six months after its enactment.

Spearheaded by Sen. George McGovern (D-S.D.), who chairs the Senate Foreign Relations Committee, the resolution is reportedly on the desks of or on its way to Senators Clifford Case (R-N.J.), John Glenn (D-Ohio) and Jacob K. Javits (R-N.Y.) for cosponsorship.

Measure 'In Limbo'

The measure will remain "in limbo," however, until the Senate disposes of other, more pressing matters, such as the Panama Canal treaties, a staff member of the Foreign Relations Committee said.

Unlike a growing number of countries in Europe, the U.S. does not have legislation that would limit the transfer of data beyond its borders. However, in the Comprehensive Right to Privacy Act introduced by Rep. Barry Goldwater Jr. (R-Calif.) and then Rep. Edward I. Koch (D-N.Y.) last year, there is a clause limiting the movement of information on individuals.

H.R. 1984 states that any organization maintaining an information system that includes personal data cannot transfer this information outside the U.S. without the individual's consent or a treaty guaranteeing the foreign government or organization receiving it will protect the data as the U.S. would. There has been no action on this bill to date.

Private Sector Input

At its subcommittee meeting, the State Department told representatives from the private sector that the government must have factual information concerning the public interest as well as that of private industry in international communications and data processing. The U.S. won't develop a policy of transborder data flows unless the private sector participates in this way and maintains political pressure, Dr. Oswald H. Ganley, deputy assistant secretary of State for technology, told attendees.

Meeting attendees complained that detailed financial and operational information on the effect international controls on transborder data flows would have is proprietary. The State Department had asked the firms, for example, for a general description of their security and access controls, the number of terminals, computers and telecommunications channels they will use this year and the numbers they plan to employ in 1983.

The government wanted this data by May 31, but the companies maintained that was too soon for complete answers to so many questions. The State Department is now considering sending a letter to the chief executive officers of major multinational companies selected from the Fortune 1,000, according to Morris Crawford, State's assistant secretary for oceans and environmental science and technology affairs.

Action in Europe

In the meantime, the State Department has turned its attention toward Europe, where the Council of Europe is working on a draft international agreement that seeks to "harmonize" the protective privacy laws already passed in such countries as Sweden and West Germany.

The State Department is focusing its attention on the U.S. proposal that another European-based international body, the Organization for Economic Cooperation and Development (OECD), create a task force to consider the legal, economic and social issues behind transborder data flows [CW, Dec. 26-Jan. 2].

While OECD hasn't established the task force yet, the State Department is "more or less" certain that will happen, Crawford said.

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Security vs. Civil Liberties

IEEE Head Sees No Easy Answer to Itar Protest

By Brad Schultz
CW Staff

NEW YORK — Recent protest from within the scientific community against federal regulations that are said to outlaw discussion of unclassified technical data such as the U.S. Data Encryption Standard [CW, Jan. 30] involves some very "fundamental issues," according to Ivan Getting, president of the Institute for Electrical and Electronics Engineers (IEEE).

Many laws have been passed over the years that "give the government an opportunity to protect the security of the United States against intentional ... and unintentional disclosure of information ... the government [has ordered] classified. These "appear oppressive to the scientific and engineering type of people," he said. "And the question 'How can this be resolved?' is not simple. It may rest on some very complex interpretations of constitutional rights."

Getting indicated that he saw issues raised by protest of the International Traffic in Arms Regulations (Itar) in two contexts: an historical process by which the increasing sophistication of data communications and digital technology entails an increasing potential threat to privacy; and an inherent tradeoff between national security interests and civil liberties.

Remarking "without security, you don't have anything else," Getting said that national security is the first consideration of the U.S. goverment.

"IEEE should approach this problem with the intention of understanding all the elements and trying to arrive at contructive modifications [of the law] if they are indicated," Getting said.

"At this stage of the game, we have asked our counsel to ... look into the matter, to recommend a [law] firm or some attorneys who are experts in the matter because it's a very specialized business," he continued, adding that in the meantime IEEE is striving to keep its members informed of the law and how it is being interpreted.

Getting said that, while IEEE may generally try to suggest that laws it considers undesirable be modified or discarded, it takes no position — pro or con — as yet in the case of Itar.

However, he indicated that Itar prosecutions must be decided on a case-by-case basis. Intent is a key factor in determining guilt, he explained, drawing a distinction between malicious and inadvertent violation of the law.

"Between 'malicious' and 'inadvertent' is a whole gray area where you knew better but you said 'The hell with it, I'm smarter than the government,'" Getting said.

The IEEE president indicated that Itar's alleged "threat" may fluctuate in time between actuality and effective dormancy, since what counts in administering laws of its type is interpretation, which is subject to change.

"You can have the same laws on the books over a period of years, say half a century. And in the beginning of that century, certain actions may have been taken as being contrary to the law, but towards the end of that half-century, those same actions might be accepted because customs and values have changed. Now, it's conceivable to me that this may happen in the current situation.

Lecht Book Gets March Debut

Publication of Charles P. Lecht's book *The Waves of Change* is tentatively scheduled for early March of this year. It originally appeared in excerpted form as a serialization in *Computerworld* between April and October. Demand for the book, an in-depth analysis of the DP industry, has been heavy, delaying its originally anticipated availability date.

Written orders for *The Waves of Change* are still being accepted. These should be mailed to Advanced Computer Techniques Corp., 437 Madison Ave., New York, N.Y. 10022. Price per copy is $39.75, including postage and handling. A sales tax of 4% or 8% is being collected only on orders originating within New York State or New York City, respectively.

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Calendar

March 1-3, San Francisco — **Computer Performance Measurement: Tools and Techniques for Increased System Productivity.** Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 13-15 in Chicago and March 27-29 in Washington, D.C.

March 1-3, Chicago — **Data Communications: An Introduction to Concepts and Systems.** Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 15-17 in Philadelphia and March 29-31 in San Francisco.

March 1-3, New York — **Word Processing: Guidelines for Planning, Design and Implementation.** Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 20-22, Washington, D.C. and March 29-31 in Chicago.

March 1-3, San Francisco — **Effective Computer Operations Management.** Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 6-8 in Philadelphia, March 20-22 in Washington, D.C., and March 27-29 in New York.

March 5-7, Orlando, Fla. — **The Small Computer Industry 1978-1980: Key Issues Facing Suppliers, Users and Investors,** sponsored by Dataquest, Inc. Contact: Kathy Davis, Dataquest, 3000 Sand Hill Road, Menlo Park, Calif. 94025.

March 6-7, Washington, D.C. — **Minicomputers and Microcomputers: Selection and Usage Guidelines.** Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 16-17 in Philadelphia and March 30-31 in New York.

March 6-8, San Francisco — **Computer Security and Privacy: Management, Legal and Technical Implications.** Contact: Continuing Education in Business and Management, University Extension, University of California, 2223 Fulton St., Berkeley, Calif. 94720.

March 6-8, Chicago — **Laser Beam Information Systems,** sponsored by the University of Chicago. Contact: Heidi E. Kaplan, Dept. 14NR, New York Management Center, 360 Lexington Ave., New York, N.Y. 10017. Also being held April 26-28 in Los Angeles, June 7-9 in New York and Aug. 7-9 in Minneapolis.

March 6-9, San Francisco — **Structured Systems,** sponsored by the American Institute of Industrial Engineers (AIIE). Contact: Dept. PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

March 6-9, Las Vegas — **Data Communications Interface '78,** sponsored by *Datamation*. Contact: Datacomm Interface, Inc. 160 Speen St., Framingham, Mass. 01701.

March 8-9, Toronto — **1978 Association for Systems Management (ASM) Conference,** sponsored by the Toronto ASM Chapter. Contact: R.D. Price, ASM, Toronto Chapter, Box 34, Toronto-Dominion Centre, Toronto M5K 1B7, Canada.

March 8-9, San Francisco — **Structured Problem Solving: Bringing Productivity Improvements to DP.** Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 20-21 in Washington, D.C.

March 9-10, St. Louis — **Personal Computers and the Development and Evaluation of Educational Programs in Computer Science and DP,** sponsored by the Association for Educational Data Systems (Aeds). Contact: Ralph E. Lee, Director, Aeds Workshops, P.O. Box 951, Rolla, Mo. 65401.

March 13-14, State College, Miss. — **10th Annual Southeastern Symposium on System Theory.** Contact: Dr. Robert Guyton, Mississippi State University College of Engineering, Drawer EE, State College, Miss. 39762.

March 13-15, New York — **Computer-Communications Network Design and Analysis,** sponsored by Columbia University. Contact: Heidi E. Kaplan, Dept. 14NR, New York Management Center, 360 Lexington Ave., New York, N.Y. 10017.

March 14-15, Washington, D.C. — **Federal Office Equipment Expo.** Contact: National Trade Productions, Inc., Suite 104, 9301 Annapolis Road, Lanham, Md. 20801.

March 20-22, Miami — **Data Processing Operations Management,** sponsored by the University of Chicago. Contact: Heidi E. Kaplan, Dept. 14NR, New York Management Center, 360 Lexington Ave., New York, N.Y. 10017. Also being held March 29-31 in San Francisco.

The CW Calendar generally appears in the first and second issues of each month, and events are listed a month in advance. All conference announcements should be sent to Calendar, CW Editorial Department, 797 Washington, St., Newton, Mass. 02160, at least six weeks prior to the month in which the event is slated to occur.

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Analyzes today's small computers and how their new roles are changing all the traditional rules of EDP. Guidelines are presented for understanding, selecting, and utilizing today's minis and micros. Instructor: William E. Augustine.

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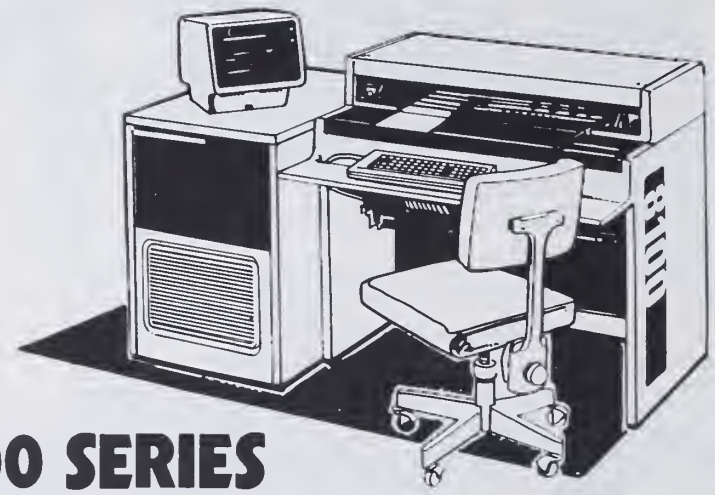

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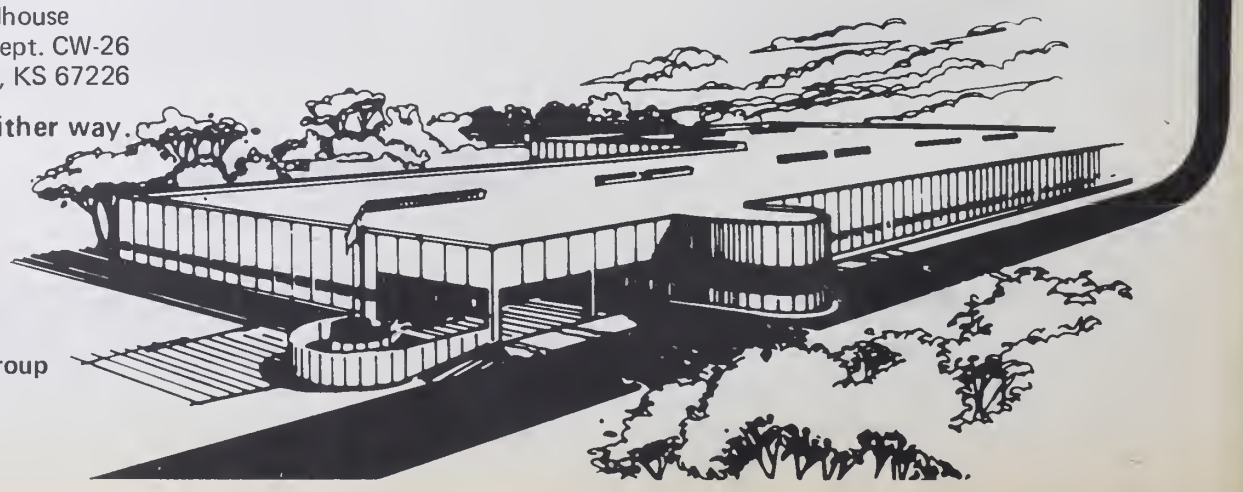

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The code also has a cross-reference for any alternative or former town name.

The magnetic tape, PB 274-150, can be purchased for $125 and the microfiche, PB 274-146, can be purchased for $17.50 for a set of 34 fiche from National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Va. 22161.

Agencies Giving Data to SSA

(Continued from Page 7)

who are veterans or railroad retirees," the GAO recommended.

Once the appropriate SSI benefits are determined, "Social Security turns information on the program's participants over to the Treasury Department, which issues the benefit checks, and to the Justice Department, which searches those individual records that the SSA suspects of fraud.

"Beginning with checks to be issued after Oct.1, 1977, a Social Security official agreed to take appropriate action to delete information on the type of recipient from the payment tapes it provides Treasury because such information is not needed by Treasury," the GAO said.

None of the agencies is aware of any unauthorized access to the information they have transferred, the report added.

How Much Security?

Citing the department of Commerce's National Bureau of Standards guidelines for federal agencies to follow in performing risk analyses to determine the security needed for the handling and storage of such data, however, the GAO said the SSA, the VA and the Railroad Retirement Board have never determined how much security should be maintained in the transfer of SSI-related information.

Risk Analysis

The Department of Health, Education and Welfare is preparing a risk analysis of the security measures it employs to send payment tapes to Treasury each month. The Railroad Retirement Board has already studied the way it sends records to the SSA and will establish by February," a uniform records transmittal procedure" to protect against unauthorized access, according to the GAO report.

The VA agreed additional security measures may be necessary.

Driver Finds 'NONE' Worse Than 'NOTHING'

RENO, Nev. — When the Department of Motor Vehicles' (DMV) computer issued Skip Swenson a bill for $953 worth of unpaid traffic tickets, he immediately decided to try to "fix" things.

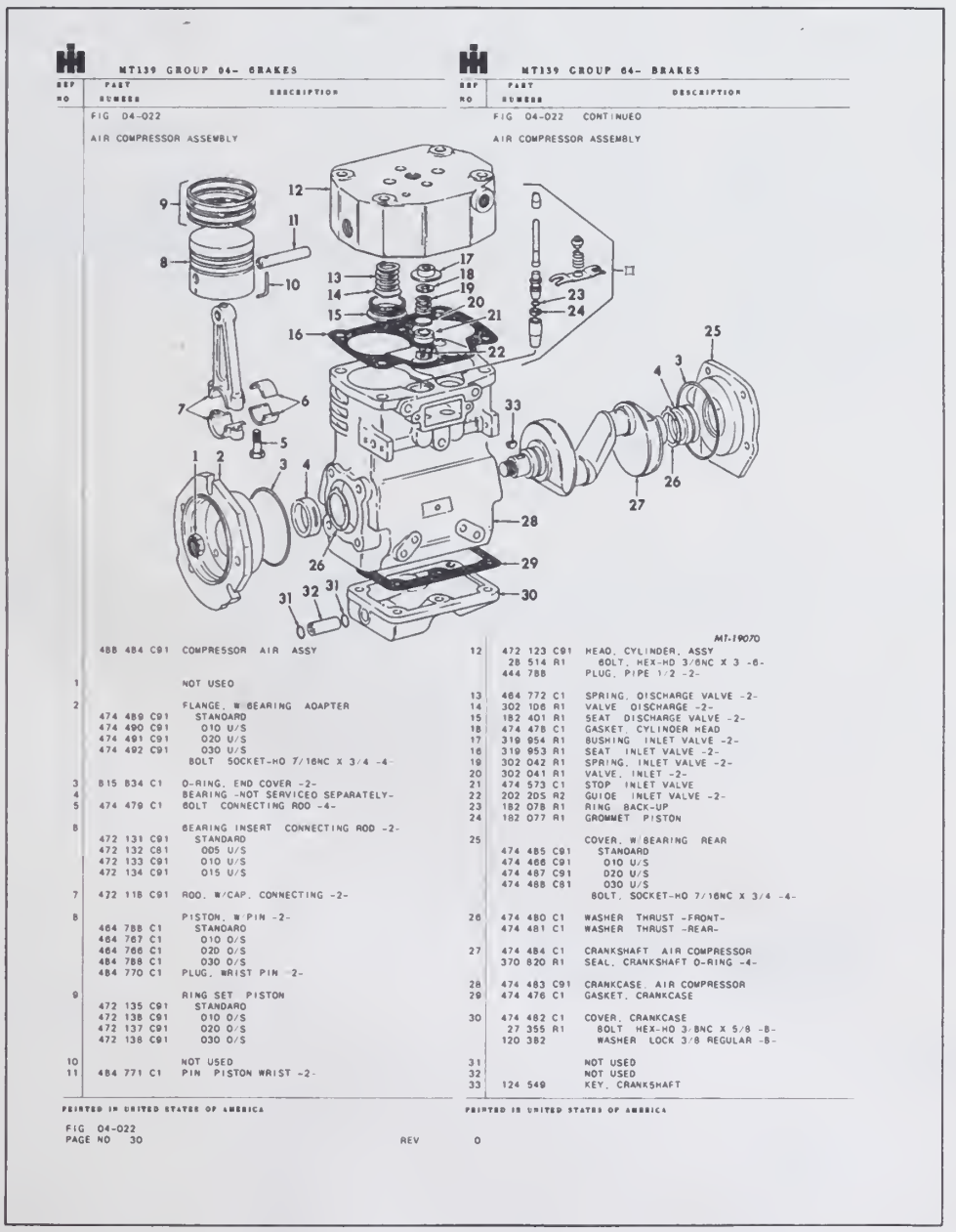
Swenson, whose car bears the vanity license plate "NONE," suspected there might be some mistake, especially since he hadn't received a ticket in seven years.

After calling the DMV and explaining his problem, Swenson discovered why he had been the target of the apparently errant computer.

Everytime a policeman would put a parking ticket on a car without a license plate, he would write the word "None" in the space where the number was to appear. The computer would then treat this comment as an ordinary license plate number, check it against registry listings and add a violation to Swenson's file.

Although the Nevada DMV has assured Swenson it is working on the problem, he thinks he might have to modify his plate slightly.

"It's too bad the word 'NOTHING' is too long, or I'd use that," he said.



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Editorial

There Must Be a Better Way

Standards are needed in the computer community, and the federal government, unfortunately, may have to lead the way in providing them.

Such standards are needed because without them users are spending more than is necessary for computers and software. The lack of standardization locks users into particular vendors' equipment and prohibits them from taking advantage of lower priced alternatives.

However, the work of the voluntary standards groups within the industry has been abysmal at best. As the recent General Accounting Office (GAO) report on the standardization process in government points out [CW, Jan. 30.], manufacturers have too often sent representatives to these groups to thwart standards rather than to support their development.

At the same time, it is very expensive to maintain a representative on these boards. Therefore, while theoretically open to all interested parties, only manufacturers regularly send representatives. Because of this, the voice of the user is notable by its absence on these boards — even though it is the user that has the most to gain from standards.

In the past, users have been urged to get involved, but that is a rather optimistic, perhaps idealistic, instance. How many user organizations can really afford to send a representative to American National Standards Institute meetings all over the country, particularly when conservative estimates show that it costs about $25,000 per year to finance such participation?

This, unfortunately, leaves only the federal government — unfortunately because standards mandated by the federal bureaucracy tend to be overrestrictive and overdone, no matter in what area.

Even with the best of intentions, federal programs too often go astray from their original principles.

It is clear that the government will now have to step up its activities in this area, however. It spends over $10 billion yearly on computers and related services and the lack of standards is costing the U.S. taxpayers over half a billion dollars a year.

The National Bureau of Standards and the Commerce Department have been called on the carpet by the GAO for their lack of activity in this area. Budgets for federal standards work will increase — and we will all have to live with the results.

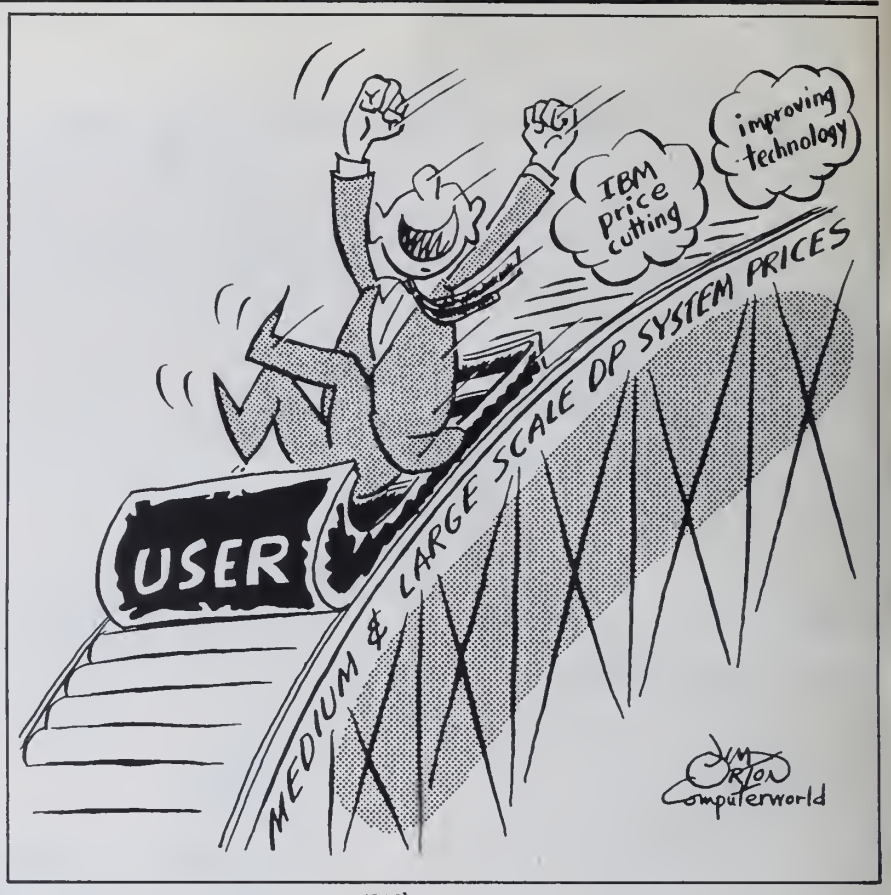
Today the mainframe makers are protesting vigorously against the adoption of what they feel will be an unworkable federal I/O interface standard. But in the past 12 years they have thwarted every attempt to develop a more workable standard.

The temptation is great, therefore, to say they are just getting what they deserve.

But the trend — toward more government mandated standards — is troublesome and could have serious consequences for the entire user community.

There must be a better way, a middle ground between manufacturer indifference to standardization and standards by government fiat.

The National Bureau of Standards should not use its increased appropriations to just build its bureaucracy, but should use the funds to support user participation in the voluntary standards process.



'Whee-e-e!'

Data Past

Five Years Ago
Feb. 7, 1973

WHITE PLAINS, N.Y. — IBM added a multiprocessing capability to the upper end of its 370 series to allow the integration of nonvirtual 155s and 165s with 158MP and 168MP mainframes. The keynote throughout the announcement was compatibility with users' existing applications programs.

— — —

NEW YORK — The Justice Department asked that IBM be compelled to reconstruct — or pay the Justice Department to reconstruct — the data base or index to the documents used in the Control Data Corp. vs. IBM antitrust case settled earlier. As part of that settlement, IBM had CDC destroy its computerized index to documents, which the government had been planning to use in its case against IBM. The department contended that the destruction of the index was in violation of pretrial orders in its case.

Eight Years Ago
Feb. 11, 1970

NEW YORK — College-trained programmers and systems analysts were found to change jobs almost twice as often as noncollege-trained programmers and systems analysts, according to a survey by Joseph M. Surkis of Oyer Professional Computer Services, Inc. here. For this reason, and because losses caused by high turnover rates were found to run into millions of dollars each year, it was predicted that many companies would decrease the emphasis on college education as a prerequisite for employment.

Letters to the Editor

Poor Statistical Methods

I read with interest "Users Award Xerox, Amdahl Top Grades in Annual Survey" [CW, Jan. 23].

Perhaps I should say that I read it with interest until I found the tabulation on Page 4, at which point I became violently ill.

You are either hopelessly ignorant statistically or determined to mislead your reading public by whatever means presents itself.

Your "universe" distributes like this:

IBM	1,291
Burroughs	146
Honeywell	130
Univac	78
NCR	70
DEC	27
CDC	23
Xerox	16
Amdahl	7

This is not a statistical universe at all.

Users don't "prefer" Amdahl and Xerox. In the first place, they have probably little or no basis for comparison. And in the second place, there is no comparison between servicing, programming, maintaining, etc. seven or 16 systems and supporting nearly 1,300, which turn out to be more in the neighborhood of 20,000 if all customers were to be counted (although that is purely a speculation). Why compare an ant and an elephant?

R.E. Kaufmann

Saratoga, Calif.

The article said that the users of Xerox and Amdahl equipment rated their computers and accompanying support higher than did the users of the other manufacturers' equipment. Users were only rating their satisfaction level with their own equipment. The sample is valid because the seven responses for Amdahl and 1,291 responses for IBM represented almost the same percentage of each firm's customer base (at the time of the survey). Ed.

Xerox CPUs Like Edsels?

The Datapro Research Corp. user satisfaction survey provided interesting food for thought; however, the editorial on the same topic ["Think, Mainframers," CW, Jan. 23] was less than incisive. The fact that Xerox Corp. with only 16 respondents, topped the list appears to me to say a lot more about people who respond to surveys than how mainframers are performing.

Seriously now, how can a company who's been out of business for over a year get a non-negative score on maintenance or support? I wonder how the Edsel would rank in a similar survey among auto owners.

Xerox, despite its performance in other endeavors and high marks in this survey, does not appear to me to be a good model for other mainframers to emulate.

Dale W. Saville

Charlotte, N.C.

Privacy Overwhelming Ethics

Ethics and privacy are popular topics of discussion, but too often privacy overwhelms ethics.

Hiring DP people is a difficult job that is not made any easier by corporate policies regarding reference checks. Let's face it, there are incompetents in this business and it really hits home when you discover one on your own staff because you couldn't get a technical reference.

It is a sad commentary on the state of the business world when you can't get an honest, ethical evaluation of an individual.

Joanne E. Peterson

Dayton, Ohio

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Detach here, fold, and place in post-paid envelope attached through binding.

In Complex Search Process

Matchmakers Need Empathy First, Then DP

By Jack Stone
Special to CW

Will the computer produce love and happiness for Dick, Jane and the other millions of "singles" around the world?

"Not directly," according to Joan Hendrickson and Susan Galloway, copresidents of an exclusive singles introduction service in D.C., newly named the Georgetown Connection, Inc. "But it can provide needed support in the complex process of finding sensible friendships for mature people," they added.

My infatuation with the relationships between computers and human affections led to my first column on these enterprising businesswomen [CW, April 25]. You may recall that they coordinate singles matching through exchanges of profiles and video interviews and have been exploring the applications of computer technology to their business.

The last installment of this systems development saga left off with their lament for data base support of the programmable calculator and my offer of a joint development program to keep abreast of their progress. I finally negotiated a no-cost barter arrangement — my most significant win of the year — wherein I exchange my microsystems expertise for exclusive rights to publish their DP memoirs plus unlimited access to their townhouse services.

So here is the next episode in the computer romance of Joan and Susan:

Q: Now that you have played around with computer concepts for a while, how do you now see the interface between your clients and your future computing system?

Joan: We don't! You see, our services are very personal. We deal in, well — love. Our clients need the qualities of a human to help them select partners. A machine can't listen to what a person says about his feelings — just out of a marriage or other relationship, or new in the area, knowing no one or hating the feelings of rejection that can be experienced at the "singles" bars. Each client must be handled individually because they all have their own special situations and personal needs.

Video Instead of DP

Q: However, you certainly interface your clients to the videotape technology. Why this and not computers?

Susan: But that's different! Our clients become engrossed in the human images on the screen, just like good TV theater, absorbing an infinity of information about a prospective selection — all the personality nuances, hand gestures, facial expressions, tone of voice, etc. Also, we don't let them operate the machine — they don't want to anyway, as it seems to interfere with their unprogrammable process of choosing a match.

Q: The mechanics of coordinating the matching must be quite complicated. Do you visualize computer support in this area?

The Human Connection

Joan: Oh, we see great potential for computer help in the "back room," as it were, but only in the hands of a trained Georgetown Connection staffer. With about 300 clients now, active and inactive — they drop in and out — we feel that machine assistance can give us the management control we need as we grow in the future.

Susan: For example, we would like to consider computerizing our client profiles. A profile contains about 30 data elements that describe, in the client's own words, his or her physical characteristics and personality traits. It also allows the client to identify and grade proficiencies in about 25 recreational and intellectual interests.

We would like to have immedate access to this information and identify all members that may meet pre-established selection criteria for a particular client. And it would be very nice to have a report generated to inform us if any clients had not been notified of their matches.

Joan: We're also talking about opening up branches in major cities and are thinking about some remote computing capabilities, still retaining central control of client records and billings.

Q: What do you think about existing hardware and software capabilities for your projected needs?

Susan: From what we've been told, we'd love to have a Commodore Pet, but we understand it's a bit short on memory and long on price relative to our applications. We've also been advised that the Basic language should pretty well handle our programming, so we've about given up on the programmable calculators.

Joan: Needless to say, it would be nice to have a computer to facilitate our record processing, but I've voted to wait a while until the prices drop. I should emphasize, however, that the real success of our business depends on the personal attention we give our clients, and there's no computer than can provide this service at any price!

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

Amid Identity, Address Errors

Forms Show Problems in Two-Field Lines

The Taylor Report
By Alan Taylor
CDP

January is here again, time for some of the bigger mass mailings. It would be appropriate, therefore, to look at the quality of these operations in 1978 and to see what improvements have been made over previous years and what mistakes persist.

First of all, J. Jonkman wrote me to find out whether *Computerworld* has started renaming cities in Texas. Jonkman, who lives in Houston and not "Houstonke City," as his mailing label said, suggested that the problem arose when he recently moved from Salt Lake City to Houston. Apparently the city-name field was not completely reinitialized. This is a good point to watch for — particularly with variable length fields.

Another CW-related item, this time on the receiving end, came from Time/Life, which was advertising *Fortune*. Here, the address was given as "N Desk-Computerworld," a 19-character abbreviated field, where apparently at one time there had been two fields — "News Desk" and "Computerworld." This had not been too long before the mailing, apparently, because the letter started "You are a hard person to find, N. Desk." (And the comment from the News Desk was "You bet I was.")

The practice of merging two fields into a single one on the printed form, while holding one of them out separately as a true-name field — all within an effective 18 characters (one is required for the dash) — seems unnecessarily severe. In this case, even with double abbbreviation, it left only six characters for a proper name. That's too few. A minimum of 10 should be permitted, unless it is certain that the first word is a forename. In the case of "News," of course, it wasn't.

Mistaken Identities

Interestingly enough, one improvement came with the same address from the same organization, Time/Life. This time, for some reason it had the address in full and had the recipient tagged as an organization, not a person. Using a four-line format, in contrast to *Fortune*'s three-line one, it came out well: "News Desk, Computerworld," etc.

The interesting point was that there was a "Dear Reader" salutation instead of "Dear Desk." And the enclosed "bonus" certificate was made out to "Addressee" and not to the desk.

This introduction and use of neutral forms when there is any doubt about the nature of the addressee is certainly a good solution. However, it does have its problems, of coùrse.

The composition of the letter has to be changed to eliminate insert references. What would have come out "When you think about it, Mr. Desk ... many of the same factors etc. etc." came out "When you think about it, you'll see that many of the same factors ..." but this is no real problem.

Embarrassing Results

A much worse problem did arise, even within Time's four-line format, when there were still two fields to be put into the name line. In this case, the second field was a title designation that is very common in this industry: "Systems Analyst."

The first address line on the mailing form was abbreviated to read "Dennis Gore Sys-Anal." Then the dash got lost, the title was concatenated with the man's name, and Gore's certificate from Time finally referred to him as "Mr. Anal."

Oh well, 1978 shows no great improvement over 1977 in keeping the mailing problem from getting weird and unwelcome results. The trouble appears to be concentrated in the truncation and multifield operations, particularly in first lines.

The solutions would seem to involve more after-processing purging, more control of field definitions (dashes are particularly droppable, it appears) and generally more control.

Hopefully, the same problems won't crop up again next year.

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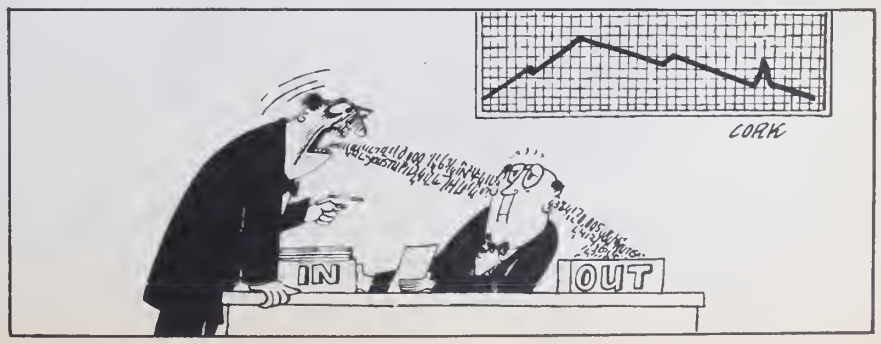

Security Function No Longer Expendable

By Jack P. Curry
Special to CW

Reader Commentary

Management has certain obligations and responsibilities for the protection of corporate assets, not only to stockholders and customers, but also to its employees. A DP security program, like homeowners' insurance, life insurance and automobile insurance, represents a commitment that should not be overlooked.

Consequently, it is up to management to recognize the importance and value of the security function and take the steps necessary to support the development of a strong and useful program.

Management must also take an active role on a continuing basis. Very little effective planning, implementation or testing can be done without its support.

First Step

The first step in establishing the security function is to assign one individual within the organization that responsibility on a full-time basis.

It is only realistic to assume a small DP shop could not absorb the increase in personnel expense. If this is the case, then at least appoint a responsible individual who, along with a minimum of other responsibilities, can absorb in his present job description the responsibility for security. The point is, no matter how large or small the shop, make someone responsible.

To whom within the organization should the security function report? Undoubtedly, the reporting mechanism may take several forms, depending primarily on the size and complexity of the organization.

In a large organization, the security function, as a staff position, could report to the comptroller, operations division, an extension of auditing or even the president of the corporation.

In a small or medium-size organization, the function could report to the quality assurance group, systems planning and support, DP manager or a facilities security manager. Let's look at why some of these might not be appropriate.

Since DP security and privacy of information are corporate issues, the person responsible for security should have access to both users and providers of DP services. As a staff position to the DP manger, the freedom of the function to appropriately coordinate efforts in the various user areas could be stifled.

The DP security function is heavily involved with establishing policy and standards for security; consequently, this should not be an audit function, since auditing is primarily involved with the evaluation of internal controls and the necessary checks and balances for compliance with established policies and procedures.

Picking the Candidate

Once the reporting mechanism is established, who, in terms of qualifications, should be appointed to the DP security function? Someone who possess the knowledge of the business and its relation to data handling, plus adequate technical skills of a DPer.

The primary reason for the dual knowledge and understanding is that it is too easy to establish policy, standards, and procedures which are unworkable and will therefore be ignored by management and employees alike.

In addition to business knowledge and DP skills, this individual must have an interest in security and its relation to DP. He will not only be involved in physical security and data security, but must also further expand the scope of security into the social issue of privacy.

Addressing what the position will include is not complete without identifying specific responsibilities — in other words, a job description. It should be recognized that a job description should be formulated around the needs and requirements of the organization.

The chances of Company A's job description for DP security being the same as those for Company B are very remote. However, there is, or should be, a marked similarity.

The following prime responsibilities should be included, especially for a medium- to large-scale DP activity with an in-house system development and programming staff:

(1) Determining appropriate policy and standards of data and physical security safeguards for the protection of corporation assets and confidentiality of information.

(2) Directing efforts for the inclusion of data security safeguards at the development stages of new corporate automated information systems.

(3) Managing the development, implementation and testing of appropriate security plans and control techniques necessary to protect against errors and omissions, fraudulent access, espionage, sabotage, natural disasters, fire, utility failures and related situations in all areas of the corporation where DP equipment, communication networks and/or personnel are located.

(4) Directing and coordinating efforts for compliance with the rules and regulations of outside governing organizations pertaining to DP security-related matters, such as the Comptroller of the Currency, Federal Trade Commission, Internal Revenue Service or local, county or state governments.

(5) Directing the development, testing and implementation of data security safeguards that will monitor the integrity of sensitive corporation application programs, computer operating systems, hardware and telecommunications networks.

(6) Directing the development of procedures for detecting, reporting and investigating breaches in security and, with the assistance of appropriate security and auditing personnel, directing the investigation of security breaches.

(7) Maintaining a continuing review of existing and proposed state and federal legislation and regulatory laws pertaining to information systems security and privacy as well as keeping corporate management aware of the regulatory changes affecting information privacy, information processing and/or security standards and techniques.

(8) Reporting to management periodically on the status of data, physical security and confidentiality conditions, including problem areas and recommended enhancements.

Conducting Risk Analysis

One of the first tasks to be undertaken by a DP security function is to evaluate the present condition of security. It is necessary for the individual to define the degree of risk in all areas and report the findings to management.

My own experience has indicated management is unaware of the corporation's exposure and loss potential, and this seems to be the primary reason for management's resistance in providing support for security.

However, this resistance can be overcome by planning and implementing a formal risk analysis program with the objective of setting potential security problems in perspective. It serves as a measurement management can understand, in addition to providing cost-effective preventive measures.

A risk analysis is not, however, a panacea that will alleviate all of the corporation's security illness. It only sets potential problems in perspective by identifying the risk in relation to the probability of the threat occurring during a given time and the expected cost.

The probability of occurrence seems to be the nebulous portion of a good risk analysis. This is primarily because of the lack of adequate historical data concerning the tampering with input, programs, master files, output, plus sabotage and theft of computer time.

Even with these pitfalls in mind, the DP security function should conduct a thorough analysis of risk and the potential impact on the corporation, followed by a presentation to management with recommendations for improvements.

If presented effectively, management will recognize the importance and value of the proposed improvements by taking the appropriate steps necessary to support their implementation.

Curry is assistant vice-president of Seattle-First National Bank, where he is also manager of data security.

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When Dealing With Management

Data on CPU Life More Useful as Graph

By James V.M. Hale
Special to CW

Fred Springer-Miller's approach to projecting CPU life [CW, Jan. 9 represents a formalization of the technique we have used within The Coca-Cola Co. for a long time.

The approach is basically one of plotting a projected workload growth curve against time and identifying the point in time at which the curve crosses some predetermined capacity value. The advantage of the technique described in the Springer-Miller article is that it enables those using it to see the effects of different growth rates.

For purposes of dealing with management, a more useful presentation of the data might be to show it graphically as a family of curves plotted on a vertical axis representing CPU power (or workload) and a horizontal axis representing time.

This graphical representation facilitates the plotting of additional curves that might result from different growth patterns, a limitation of the basic technique as described.

For example, in real life the growth pattern is often a combination of a compounded annual rate, cyclical variations and some step functions. The annual rate is tied to normal systems activity, business growth, etc.; the cyclical variations relate to peak business period, accounting cycles, etc.; and the step functions relate to implementations of major new applications.

Of course, the basic problem with using this type of technique is the limited ability to predict with some degree of accuracy the growth pattern which will be experienced and to derive the relative power relationships between the various systems *in the context of the installation's operating environment.*

The former is dependent upon good long-range planning, while the latter is at best a very difficult factor to quantify since it depends upon job characteristics, job mix, scheduling constraints, systems software and installation performance criteria, to name a few factors.

As Springer-Miller pointed out, in installations with significant online applications, the solution must frequently be based on prime shift or even on peak busy period constraints.

For those wishing to derive for their own use tables similar to those given, there was apparently a misprint in the article. The correct formula for APL to generate the table as shown should be:

```
6 ⍴⍳0 [1+B)°.*A
```

Mathematically, the relationship is:

$$L = \log [1+B]A$$

where L = life expectancy in years; A = relative CPU power; and B = annual compound growth rate expressed as a decimal value.

Hale is manager of computer planning at The Coca-Cola Co. in Atlanta.

Reader Commentary

What Happened to 14th Amendment?

By Robert M. Sherin
Special to CW

The State of Tennessee's attempt to levy a use tax on in-house software [CW, Jan. 16] doesn't surprise me. Florida got away with it for a time. California, where software taxation originated, also has been getting away with it for years.

What sets Tennessee apart is a flagrant disregard for the U.S. Constitution that outclasses the rest. All U.S. citizens are guaranteed due process and equal protection of law by the 14th Amendment. The essence of the guarantee is simply that whatever classifications are made in the statute be reasonable and rational.

Nothing could be more unreasonable and irrational than Tennessee's classification as tangible the identical software the Tennessee Supreme Court found intangible (Commerce Union Bank vs. Tidwell) for sales and rise tax purposes. While my class action in federal court (Sherin vs. Tennessee) does deal with taxation, its major importance lies in the broad legal ramifications of Tennessee's unquestionably arbitrary classification.

Based upon the tangible/intangible classification, courts and legislative bodies are making new law by reviewing the status quo. Allowing an arbitrary legislative classification diametrically opposite to that of the Tennessee Supreme Court as the centerpiece of new law clearly deprives those affected of due process and equal protection.

Whether software is patentable or a trade secret is determined by the tangible or intangible classification.

The 14th Amendment was designed to protect U.S. citizens against state abuse by making federal citizenship paramount. Ratified in 1868, it has been strengthened through case law.

Sherin vs. Tennessee is the first case of the computer age on this broad issue of software classification to reach a federal appellate court.

The appeal resulted from Judge L. Clure Morton's ruling in a Tennessee district court that the federal due process guarantees does not apply to software taxation in Tennessee:

"No, the state legislature can't override Congress. But we are talking about here in your case . . . the taxing of products within Tennessee, and those products are then tangible within the state, and congress has no control over them when they come to rest here."

Whether our 14th amendment guarantee will be enforced in Tennessee is now to be decided by the Sixth U.S. Circuit Court of Appeals in Cincinnati. I feel strongly it will be.

Sherin is president of Nova Computing Services, Inc. of Miami

what, me?
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Further Clarification Of NCR Policy

Although our policy on maintenance of NCR equipment sold by someone other than NCR Corp. seems clear to us and to our customers, there is apparently some confusion on the part of *Computerworld* as evidenced by "NCR 'Clarifies' Upkeep Policy on Resold Units" [CW, Jan. 9].

Since the article may have caused misunderstanding, I would like to point out the following facts:

When equipment is sold by someone other than NCR, our field engineers will, in most cases, inspect and install that equipment within two weeks.

It is in the customer's interest that we handle the installation of used equipment expeditiously and it is in our own interest that we do so. If we did not, we would place ourselves at a competitive disadvantage.

One would infer from the CW article that NCR was tardy in issuing a clarification on maintenance questions raised last summer. What was described as a "recent statement" was actually made last fall. The policy has been disseminated throughout our field engineering organization and has been discussed with NCR customers. In addition, a comprehensive article describing the policy has appeared in a quarterly publication which is received by members of all NCR user groups. Yet your article described the policy as "still not widely distributed."

The article also stated that the "cost of services needed to put the equipment into satisfactory condition would be borne by the prospective buyer." In actual fact, the terms of the sales contract usually specify who pays for necessary servicing when used equipment is sold. NCR's policy is to bill the buyer of the equipment for the services. However, someone other than the buyer may actually pay for the servicing.

NCR fully realizes the importance of available maintenance to the resale value of a customer's equipment.

R.W. Gaines
Vice-President

Letters to the Editor

Field Engineering Division
NCR Corp.
Dayton, Ohio

Missed the Point

If Russell A. Hersch had not interpreted things so literally, ["UN, ACM Can't Be Compared," CW, Jan. 23], he might have understood the point behind my letter regarding the Association for Computing Machinery's (ACM) severing of ties with the Soviet Union. As it is, he missed the point — completely.

I agree with Hersch regarding human rights in the USSR, but I feel strongly that:

• It is impossible for parties to understand or change each other's ideas (philosophies, ideologies, etc.) if they do not communicate with each other. I am an advocate of the "we agree to disagree" approach.

• Parties which have areas of strong (or even complete) disagreement can still benefit from exchanges of views and ideas in other, nonrelated areas.

It seemed to me that both these points can be applied to the ACM/USSR decision and the problem of keeping mainland China out of the UN for so long. Problems do not usually go away just because one refuses to talk about them.

By taking the action it has, the ACM has left itself no hope (however slight) of having even the slightest long-term influence on the human rights question in Russia, yet it claims to want just that influence.

I continue to deplore the ACM's action and the shortsighted, ostrich-like logic which seems to have prompted that action.

H.R. Sides
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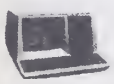

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Non-Codasyl DBMS a Bad Choice for Users

By L.E. Towner
Special to CW

Raging within the software industry today is a fierce battle for position within the developing data base management system (DBMS) market. Particularly for those vendors who sell products for IBM 360/370 hardware (and its compatible competitors), the competition is often brutal.

The term Codasyl, an acronym for the Conference on Data System Languages, is being encountered with increasing frequency. The vendors who follow the Codasyl recommendations insist it is the only way to go.

On the other hand, the vendors who don't follow Codasyl either claim to be "Codasyl-like" or badmouth it.

Who cares? Let's go back in history a bit.

In 1960, an obscure organization composed of vendors, users and other interested parties proposed the development of an English-like, high-level programming language. The Codasyl committees which worked on this language wanted something that could satisfy the increasing need for a business-oriented language.

Reader Commentary

When it was first announced, all of the "experts" said Cobol would die an early death. It was too unwieldy, they contended.

Well, today Cobol is used in over 80% of the installations, excluding minicomputers, in the world. It is one of the very few computer languages recognized by the American National Standards Institute (Ansi).

Now, on to DBMS. Codasyl started working on DBMS standards and specifications in 1966. It published the first draft specification in 1968, followed by a more detailed one in 1971.

In 1975 the Data Manipulation Language (DML) was submitted to Ansi for standardization. It has been accepted and is likely to appear in the next update ot the Ansi Cobol standard.

The language used to define the data base structure itself, the Data Definition Language (DDL), is being readied for Ansi.

History appears to be repeating itself. The "experts" are still saying it will never fly. However, nearly all of the data base packages developed in the last four years used the Codasyl specification as their guide.

How does this affect the user? It depends on his perspective of the future and how rich he is.

Assuming the trend toward Codasyl standardization continues, the non-Codasyl DBMS vendor will be forced to upgrade his system to meet the standard. When that happens, the user will have two choices — both bad.

His first alternative is to rewrite all his application programs and restructure his data bases to conform with the vendor's upgraded package. Expensive? The cost will make his last conversion from one computer to another look like peanuts.

The second alternative for the user is to stick with what he has. However, if he thinks the vendor will continue to enhance and maintain what it considers an obsolete version, he had better think again.

Before taking that big step into the world of data base, the user had better separate all of the wheat from the chaff and find out what it will really cost to implement a data base. He should not allow the vendor's salesmen to blind him to the fact that buying a non-Codasyl DBMS will return to haunt him when he can least afford it.

Towner heads the Systems Management Division of the Naval Intelligence Processing System Support Activity in Alexandria, Va.

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Wisconsin Survey Indicates

DOS/VS Shops Going to On-Line Work

By Don Leavitt
CW Staff

KAUKAUNA, Wis. — Even among the small IBM 360 and 370 installations, on-line systems — including on-line program development services — are becoming a way of life, if results of a recent survey of the Northeastern Wisconsin DOS/VS User Group are any indication of patterns.

The group's president, James L. Downs, DP manager at Thilmany Pulp & Paper Co. here, reported he got responses from 34 of 40 installations in the group; 24 of them use CRTs or hard-copy terminals while three others utilize remote job entry terminals.

Within the group, 22 shops use some form of specialized data communications software. Although Downs didn't identify specific software, he noted parenthetically that 80% of what his group members use comes from IBM.

Seventeen of the installations use specialized data base software, he added, and 60% of it was supplied by IBM.

On-line software devleopment support is provided by 11 installations, the report showed without noting what change, if any, had occurred in this figure since the group's last annual survey. Perhaps the fact that one-third of this group is using on-line techniques shows there will be more movement in this direction in the future, Downs suggested.

Twenty-three out of the 25 shops running under DOS/VS are using either Release 33 or 34. The other two DOS/VS users are on Release 32 and two installations in the group are staying with Release 26, the last one available for normal 360 use.

The remaining installations are using independent alternatives such as Extended DOS (Edos) from The Computer Software Co. of Dearborn III from Dearborn Leasing, Downs said. He also noted that 21 shops were using the Power/VS spooler provided free with DOS/VS, two were using Power and three were renters of Grasp from SDI, Inc.

Although all installations surveyed use some form of disk storage, Downs said only four shops utilize disk space management software. With much the same pattern, 30 installations have magnetic tape operations, but only eight are currently utilizing automated tape control systems.

CPU Numbers Growing

Generally confirming the picture presented last year by the Minnesota DOS Users Group, Downs reported 33% of his group have IBM 370/138s, 27% are scattered on 370/125s, 135s and 148s and 17% are running with 370/115s. Twenty-three percent of the group still uses IBM 360/30s, 50s and 65s.

There's growth here, the survey showed. Fifteen CPUs are on order for installation this year and these include six 370/138s, three 370/148s, one 370/115-2 and five of IBM's 3031 processors.

Memory sizes represented by the group range from 32K to 1M bytes with the high end of that

(Continued on Page 24)

PL/I Available for PDP-11s

CHAPEL HILL, N.C. — While Data General Corp. and IBM race each other to get PL/I to their users this spring [CW, Jan. 23], a small software house here — Applied Information Systems, Inc. (AIS) — has had the language up and running at various Digital Equipment Corp. PDP-11 sites for more than a year.

The AIS software includes both a compiler and a runtime system for use under DEC's RSX environments, according to a spokesman.

The compiler is a subset of the complete language specifications sanctioned by the American National Standards Institute (Ansi). Like the compilers from DG and IBM, however, it will be "approximately compatible" with the subset Ansi is now formulating, the spokesman said.

String Structures

Currently the AIS compiler has no decimal arithmetic, but it has strong support for bit- and character-string structures and good I/O, he claimed. It works through the operating system's access methods and supports in-line, reentrant and recursive code.

It also supports fixed-point and floating-point numbers.

Version 1, now available, requires DEC's floating-point hardware, but Version 2, expected this summer, will not. The update will also provide the now-missing decimal arithmetic and support for multikeyed Isam "if we can determine how it would fit into PL/I efficiently," the spokesman said.

Currently the software is most effective in applications with extensive file handling and in which considerable amount of the work involves nonnumeric data, he noted, citing communications message switching and transaction processing as examples.

The company is distributing the PL/I package on 9-track tape or a DEC RK05 disk pack, although other media are possible. The $4,000 cost does not include on-site support since "any system programmer" can install it "inside an hour."

AIS can be reached through Box 2584, Chapel Hill, N.C. 27514.

Low-Cost Package Checks CICS/VS

BOISE, Idaho — A series of CICS/VS utility programs, developed by Robert M. White, a systems software specialist with the State Auditor's Office here, provides users with inquiry capabilities into many aspects of CICS/VS and OS/VS.

Written at public expense and now in the public domain, the programs are available from White for the cost of reproduction — $103.

As White described the package, it was designed to display certain basic functions in both OS/VS1 and CICS/VS. Since that basic development work, however, certain maintenance functions have been added to enhance its capabilities, he said.

In the user manual, the functions are outlined in the following areas: OS/VS1 data management; OS/VS1 internals; CICS/-VS internals; and "Games (fun stuff)."

Under OS/VS1 data management, the system can list an entire Volume Table of Contents (Vtoc) in summary format or list a data set's Vtoc entry. A Partitioned Data Set (PDS) directory can be listed and so can a PDS member of a source library, White noted.

More actively, the routines can be used to rename or scratch a data set; catalog or uncatalog a data set; or delete or rename a PDS member, he added.

Working with the OS/VS1 internals, users can display Unit Control Blocks (UCB), input or output queues, active tasks or partitions in the system, a job's Syspool output or any outstanding operator messages. Through White's package, users can also issue any operator command.

Similarly with CICS/VS internals, users can display and maintain the Processing Program Table (PPT) as well as the Processing Control Table (PCT). Display and maintenance for the Terminal Control Table (TCT) and display of current CICS/VS statistics are other capabilities.

To keep costs down, users are required to provide their own magnetic tapes. More information is available from White at the Idaho State Auditor's Office, 650 W. State St., Boise, Idaho 83720.

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Using 'Datacom/DC'

Package Handles Accounts Receivable On-Line

DALLAS — Designed to work with Datacom/DC as its teleprocessing monitor, the On-Line Accounts Receivable (Olar) package from Insyte Applications Corp. is essentially a substantial library for functional modules and vendor-provided customization to make the library fit the user's needs.

The customization is usually complete enough so the vendor claims there is no need for the user to modify any existing accounting procedures; the package will meet the user's requirement once the system is ready for implementation, a spokesman said.

There are several modules related to cash applications/cash management, he said, citing support for balance forward or open item accounting — or both — as one set of alternatives available. Within the open item alternative, the user may actually have cash applied by line item or by invoice, another Insyte source pointed out.

Provision for on-line customer file maintenance and inquiries on customer cash positions are other facilities, the spokesman noted.

The package included embedded logic similar to the Datacom/DB data base management systen so that there is far less rigidity than in a file-oriented system, he said. The system generated a set of standard reports but also lets the user create "unlimited" CRT screen formats.

Written in Cobol, Olar includes backing for up to 16-level security safeguards, the spokesman added.

The package typically costs $40,000, which includes provision for substantial custom work. Users who already have the Datacom/DB software installed get a 10% discount on the cost.

While Datacom/DC is the communications vehicle now, interfaces for both Turnkey System's Task/-Master and IBM's CICS are coming, probably this year, Insyte noted from 3707 Rawlins St., Dallas, Texas 75219.

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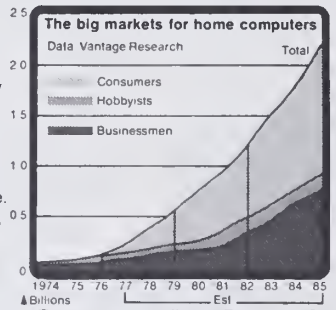

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Datapoint Enhances RPG, Adds IBM-Like Capabilities

SAN ANTONIO, Texas — Tailored specifically for Datapoint Corp.'s 5500 and 6600 series processors, RPG Plus has been introduced by the company as an enhanced version of the RPG-II it has had for some time.

The modifications bring the Datapoint language closer to what IBM and others implemented previously. They will ease program development and conversion of programs created under other RPGs, a spokesman said.

A "Move Array" verb, now available in the RPG Plus calculation section, duplicates a facility IBM has had; therefore, users now have an easier time moving programs that use this verb in an IBM setting to Datapoint equipment, he claimed.

RPG Plus now supports a COPY command and allows input records to be described in any order. This combination permits the creation of standardized file definitions that can be stored on disk and used for more than one program, the spokesman added.

The RPG Plus object programs, generated in relocatable code, can be stored in a relocatable library separate from the compiler.

The RPG Plus compiler can be used on any Datapoint 5500 or 6600 processor as well as on any 3800 or 6000 series Attached Processor, he added, further enhancing the capabilities of the Attached Resource Computer recently announced by Datapoint [CW, Dec. 5].

Object programs can be run on any Datapoint 1150 or 1170 Dispersed Processor in addition to the units which can handle the compiler, the spokesman stated.

RPG Plus is available under license for a one-time fee of $2,000 or monthly fees of $50, with discounts available for installations acquiring more than one compiler.

Datapoint is at 9725 Datapoint Drive, San Antonio, Texas 78284.

Ecma OKs 'Milestones'

GENEVA, Switzerland — The European Computer Manufacturers Association (Ecma) has adopted three standards, "each a milestone," according to a spokesman.

The assocition adopted a Minimal Basic standard which has the same technical content as the present American National Standards Institute draft, although it is edited slightly differently. It also accepted a proposal providing the first internal standard for the flexible disk cartridge, he said.

Ecma also adopted a standard for the representation of source programs — in APL, Cobol, Fortran, Minimal Basic and PL/I — for program interchange. It is an attempt to improve the portability of programs, the spokesman explained.

The standard links the character sets defined in the individual language standards and their coded representation by means of a 7-bit code and its implementation on a variety of data carriers. It is a standard of a new type in which already-standardized features are assembled in a new standardized combination aimed at supporting interchange and decreasing implementation dependence, the spokesman emphasized.

Copies of this standard (Ecma-53), the one on floppy disks (Ecma-54) and the one on Minimal Basic (Ecma-55) are available free from the association offices, 114 Rue du Rhone, Geneva, Switzerland.

DOS/VS Moving On-Line

(Continued from Page 23)

scale accounting for 20% of the installations. The "most popular" size was 512K bytes, used by 25% of the shops, while 20% had 128K installed.

Although Downs didn't show the ratios of virtual to real memory being utilized under DOS/VS, he noted that virtual memories ranged from 360K to 4.5M bytes, with 1.95M the average.

The currently installed CPUs were very evenly distributed between those rented from IBM (26%), leased from IBM (26%),purchased (26%) and leased from a third party (22%), the survey indicated.

The work week for 60% of the installations typically is five days, while 19% work six days and the rest work seven. During the work day, half the installations work around the clock, 18% work two shifts and the others range from 10 to 23 hours, Downs said.

The total staff size — operations, systems and programming — ranged from a low of five to a high of 106. The typical size appeared to be about 18, although six shops that were "very large" in Downs' view (with 106, 88, 77, 58, 56 and 47 people) would lead to a different mathematical average.

Downs ended the survey report by noting the typical DP budget with his group was $650,000, ranging from $230,000 to $1.5 million.

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Sigplan Meeting to Trace Languages' Growth

LOS ANGELES — A conference intended to document some of the history of programming languages will be held here June 1-3, just prior to the 1978 National Computer Conference.

Sponsored by the Special Interest Group on Programming Languages (Sigplan) of the Association for Computing Machinery (ACM), the meeting is meant to record the significant events that created the need for development of various languages, the environment in which decisions were made and the rationale behind the decisions that led to each language's style.

At least one key contributor to the original development of each programming language will present a paper on the language and participate in discussions, according to conference chairman, Jean C. Sammet.

ACM emphasized that the conference will not address the entire history of programming languages, since it will be limited to those languages in use by the end of 1967 and by then considered most signficant in terms of usage, influence on language design, overall impact on environment, novelty and uniqueness.

Copies of the presentations will be available before the conference as an issue of "Sigplan Notices" and afterwards as the final edited proceedings.

Attendance will be open to the capacity of Hyatt House Hotel (Los Angeles International Airport) facilities on a first-come, first-served basis, ACM said, strongly recommending advanced registration.

Registrations made now cost $50 for those who are members of ACM and Sigplan and $65 for those who hold neither membership, according to registration chairman Rorrie Ratkevich, Ground Systems Group, Hughes Aircraft, 1901 W. Malvern, Mail Drop 606-K126, Fullerton, Calif. 92634.

Speakers

Sigplan's conference will include the following languages and presentors:

Algol - Al Perlis, Peter Naur
APL - Ken Iverson
APT - Douglas Ross
Basic - Tom Kurtz
Cobol - Jean Sammet
Fortran - John Backus
GPSS - Geoff Gordon
Joss - Cliff Shaw
Jovial - Jules Schwartz
Lisp - John McCarthy
PL/I - George Radin
Snobol - Ralph Griswold

'Cadam' Aids Manufacturer

WHITE PLAINS, N.Y. — A graphics software package said to improve manufacturing productivity from design conception through machine tooling has been developed by Lockheed Corp.and is being marketed by IBM.

The Computer-Graphics Augmented Design and Manufacturing System (Cadam) is a set of programs that supports IBM's 3250 graphics display system and the 2250 Model 3 display unit when tied to a 370 mainframe.

The Cadam data base can be used in five interrelated areas of engineering and manufacturing: design, analysis, drafting, tool design and numerical control (NC) programming.

As an example, IBM noted that with Cadam a part designer can use a CRT as if it were a drafting board, constructing the geometry of his design from a rough sketch or an idea.

Several parts can be displayed simultaneously to ensure they fit together properly, IBM said.

Once the designer is satisfied with it, the part drawing can be stored in the Cadam data base and retrieved by other designers for use in drawing their own designs or checking design compatibility.

A draftsman at a CRT screen can work with the drawing, adding such details as physical dimensions in metric or English units; when required, the drawing can then be printed in hard-copy form, IBM noted.

A tooling engineer can then use the drawing to design the machine tooling by which the part is produced, and finally, the NC programmer can write and debug the program actually used to direct the tooling. Cutter movement can be followed on the CRT screen.

Cadam requires an IBM 370/135 or larger CPU and is being marketed by IBM as an Installed User Program. Prices for Cadam range from an initial charge of $18,000 and a monthly license fee of $1,600 to an initial charge of $41,000 and a monthly license fee of $3,800, depending on hardware configuration and whether NC capability is needed.

DTC Microfile Gains Fortran

CAMPBELL, Calif. — A Fortran compiler for use with the Data Terminals and Communications (DTC) Microfile commercial/data communications system has been announced by the firm.

DTC's compiler is said to be Ansi Fortran '66-compatible except that support for complex arithmetic is omitted. In addition, the instruction set includes PEEK and POKE commands for writing into and reading from specific memory locations and INP and OUT for working with I/O ports, DTC noted.

The Microfile system is microcomputer-based, featuring either two or four disk drives and giving 600K to 1,200K bytes of on-line storage, the firm said, noting that the system is available with an Extended Basic Interpreter and applications software in addition to the Fortran capability.

The Fortran compiler is six to 10 times faster in computing than the Extended Basic interpreter, according to DTC.

The compiler is available for $500 from the company at 1190 Dell Ave., Campbell, Calif. 95008.

'DDP/1' Pushes Series/1 Usage

BOULDER, Colo. — The Distributed Data Processing (DDP/1) package from System Design & Development Corp. provides the IBM Series/1 user with data entry, data management and teleprocessing services to support remote job entry and local DP requirements, the vendor said.

The software features a programmerless approach with system commands entered through menus, providing access to forms generation, data editing and such data management services as dynamic file definition and automatic disk space allocation, a spokesman said.

Data prepared at the Series/1 can be processed locally or by a host, according to the firm, and teleprocessing of data between the CPU with DDP/1 and others is possible using bisynchronous communications over private or switched lines.

DDP/1 supports all IBM Series/1 announced printers, display stations and disk devices, the spokesman noted. The local processing mode reportedly accommodates program development and production using IBMs assembler and Fortran and PL/1 compilers.

DDP/1 is licensed for multiple use, with the $20,000 license fee dropping to $1,000 per license for quantity orders, the firm said, adding Series/1 equipment required to operate the product begins at $27,905.

Systems Design & Development Corp. is at 2355 Canyon Blvd., Boulder, Colo. 80302.

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TU-BE OR NOT TU-BE

Alas, poor Yorick, his program won't run.
It went down the tubes at a quarter to one.
When called to explain why his run had exploded,
He couldn't be sure they had run what he coded.
Did they mount the wrong file, or have bad JCL?
He needed hard copy in order to tell.

For although console messages flashed on the screen,
The one guy who needs them was far from the scene.
Alas, poor Yorick, faced another long wait.
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Efficiency vs. Flexibility

Once for Designers, DBMS Now Keyed to User

By Roy Wood
And Robert B. Chamberlain
Special to CW

An important and widely recognized movement in DP during the late 1960s and early 1970s was the shift from being machine-intensive because of high capital expenditures to being people-intensive. This movement arose from a combination of higher salaries and greater systems complexity, which increased DP staff expense while cheaper mainframes and cores decreased hardware expenditure.

The concept of the data base management system (DBMS) was a significant response to this shift. The rationale behind the concept is well-known but bears reiteration because some hidden implications have a time-dependent relationship with the origination of the concept itself.

The DBMS is an attempt to reduce the overhead and the inefficiency of complex and redundant file-oriented systems by centralizing data and making it program-independent.

The attractiveness of this, of course, is not the mere aesthetics of clean systems (or, for that matter, "structured" systems), but rather is contained in the bottom line of staff and system expenses; the DBMS has a distinct potential for staff reduction because of its briefer implementation time and the reduced maintenance required in environments with a successfully implemented DBMS.

There is, however, an irony present in that the development styles of the original DBMS have tended to weaken the goals of program, and particularly programmer, independence.

Data Basics

Although the original data base packages were conceived in the glow of program independence, they were delivered by practitioners of machine/-core optimization. The good intention of program independence through DBMS was itself compromised by design and implementation goals that emphasized efficient use of machines rather than people, despite the changing machine/people relationships which brought them into being.

We call these original packages "designer" systems because of their emphasis on skillful user implementation in order to function effectively. They contrast with the later "end-user" systems which allow a user to use a DBMS more simply, but with an accompanying loss of discretion regarding physical structuring of the data base.

The trade-off then becomes utilizing hardware and saving designers, programmers and clerical staff.

System Characteristics

What are some other characteristics of designer and end-user systems? Designer DBMS, as the name implies, require higher levels of skill in system designers because of their greater potential variance in hardware efficiency.

They are, furthermore, rigid and oriented toward programmers rather than non-DP management and clerical staff. The interaction between the system and the user is preformatted and structured with a rather fixed output potential.

End-user systems, on the other hand, are oriented toward browsing the data to meet unstructured requirements which closely simulate real world demands. The end-user approach tends generally to use more hardware resources, but it saves in people (designers and programmers), the more valuable resource.

Management information systems (MIS) of the mid-1960s failed largely because of insufficient management support, hardware that was not adequate or cheap enough and a DP staff that frequently became overly involved in efficient use of hardware.

Designs were done in the DP shop rather than in the offices of the client. DP traded toward the hardware rather than the user because staff was less expensive then.

For example, DP concentrated on creating large files that were mostly sequential and not integrated, since on-line storage was expensive. Reports were generated in fixed formats, with as many reports as possible created in one pass of the master file from either existing application programs or generalized report writer specifications.

The DBMS designed in the mid-1960s (Honeywell's IDS and IBM's IMS) reflect that period's orientation toward hardware efficiency. They are classic designer systems and lend themselves to very efficient structures, given a firm set of data maintenance and reporting services to provide.

But herein lies the problem. The minute user functions and services appear rigid and fixed, the world moves on and they must be changed.

Of course, maintenance is most efficient, physically, but data does not last long enough in a particular state to truly measure real efficiency. The physical efficiency does exist because one can quickly add new records into the data space or delete records by removing several pointers.

Designer system reporting is somewhat less efficient. It can be characterized as the printing of large groups of data or searching an entire data base, spinning off many reports with one pass.

This remains efficient as long as the user does not make ad hoc requests which require passing the entire data base.

The Real Concern

Reporting, however, is not the overriding concern in the design of a designer data base. It is, instead, updating.

Because reporting is the main issue with management and users and receives the greatest attention, however, it is the potential Achilles heel of the designer system.

Designer DBMS efficiency costs in user design dollars initially and can cost in designer and programmer dollars later. Also, a new application has a high probability of harming a user's designer system structure, forcing redesign with more design expense time.

Current Thinking

Current thinking is that DP organizations will be most beneficial in supporting management information needs if they can respond quickly to many new and different information demands. This means, more specifically, that data processing must trade off in the direction of providing user/client services without necessarily optimizing hardware, by the use of designers from both DP and the relevant business disciplines.

These trade-offs are more readily equated with such recently developed data base packages as MRI Systems Corp.'s System 2000, Computer Corp. of America's Model 204, Software AG's Adabas and Insyte Datacom Corp's Datacom. They have two things in common:

- They can be fully inverted structures.
- They tend to be heavy users of the CPU and, in some cases, disk storage.

These characteristics are quite dissimilar from the designer systems that use pointers or chains and do not normally require much disk storage beyond normal data.

Both IMS and the Codasyl committee have addressed the question of inverted indexes. IMS now supports secondary indexes while the Codasyl group recommends inverted indexes as a capability of a Codasyl system, to be stored in owner records.

It is, of course, possible for users of designer DBMS to implement the direct index approach, but they now must incur the responsibility for index maintenance and logic operations to effectively utilize the inverted indexes.

This would seem prohibitive where a user's needs could be met more efficiently through an end-user system. In fact, the need for such a device highlights the rigidity inherent in designer systems.

Wood is director of education for Software AG of North America, Reston, Va., and Chamberlain is with CACI in Europe.

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Planning the Key to Easy DOS-OS Conversion

By Wayne Brown
And Dave Lawlis
Special to CW

DALLAS — Despite all the horror stories we had heard about converting from DOS to OS, by late 1976 we felt we had no choice but to make the change.

Continental-Emsco is an oil and gas field equipment manufacturing company, headquartered here, with approximately 3,000 employees worldwide.

With DOS, we were bogging down. We needed to pick up additional partitions and capacity and had made the decision to go to an IBM 370/148. We also needed better communications facilities since our plans include installing terminals in more than 50 sites in 1978.

Hardly anyone at Continental-Emsco really knew much about OS, but we did know we had to have a plan before we could do anything about converting. And this plan paid off. It was planning that made our DOS to OS conversion fast and relatively painless.

We had designed and established our OS standards and had put together a booklet for the people at our remote sites to study. We also renamed our data sets and designed JCL forms to fit our installation.

With the standards already set up, everyone was working on the same plan and going in the same direction. We felt it was imperative to know what we were going to do before we could do it.

Also, as part of our strategy (and because we knew we couldn't do everything ourselves), we decided to use a conversion aid.

After looking at the aids presently on the market and studying their pros and cons, we chose UCC Two (Duo) from University Computing Co.

One of the things that was important to us was that with UCC Two, we didn't have to maintain duplicate files shared by several systems. Conversion without UCC Two would have meant converting all systems that used these files at the same time or maintaining DOS and OS copies of the files during conversion.

The package also allowed us to convert to OS without having to know about OS. We could take it one step at a time. This was especially important since only one person with Emsco had attended OS school during the entire conversion.

We installed UCC Two in mid-January of 1977. By mid-April, we were in OS production with the package. Before we went into production, however, we tested quite thoroughly.

Two-and-a-half to three months after we started production work, about the first of August, we began native conversion of the approximately 2,000 Cobol programs we were using under UCC Two.

This conversion was strictly changing programs — select statements, file names, removing console messages and whatever other oddities DOS would let us get away with that OS wouldn't. We did a lot of cleaning up during the native conversion.

Now we are on the last leg of the conversion, and after mid-January — exactly a year after we began — we no longer needed UCC Two.

The UCC Two package gave us a lot of help. We couldn't stop production and just work on the conversion. Using the package allowed us to meet our production schedules and development commitments during the conversion.

Another plus — the conversion was practically transparent to our users.

In spite of all our planning and the use of a conversion aid, we did, of course, run into some problems.

We had trouble with debugging because we weren't used to OS.

The biggest problem we had, though, was just learning OS. That is still a problem. Even after a year, we are continuing to learn OS and probably always will be in a learning phase.

In the way of training, we had video tape self-study courses on OS dump, JCL and on concepts and facilities and utilities for our DP employees to help familiarize everyone with what we were doing.

Brown is manager, systems and programming and Lawlis is a systems programmer at Continental-Emsco Co., Dallas, Texas.

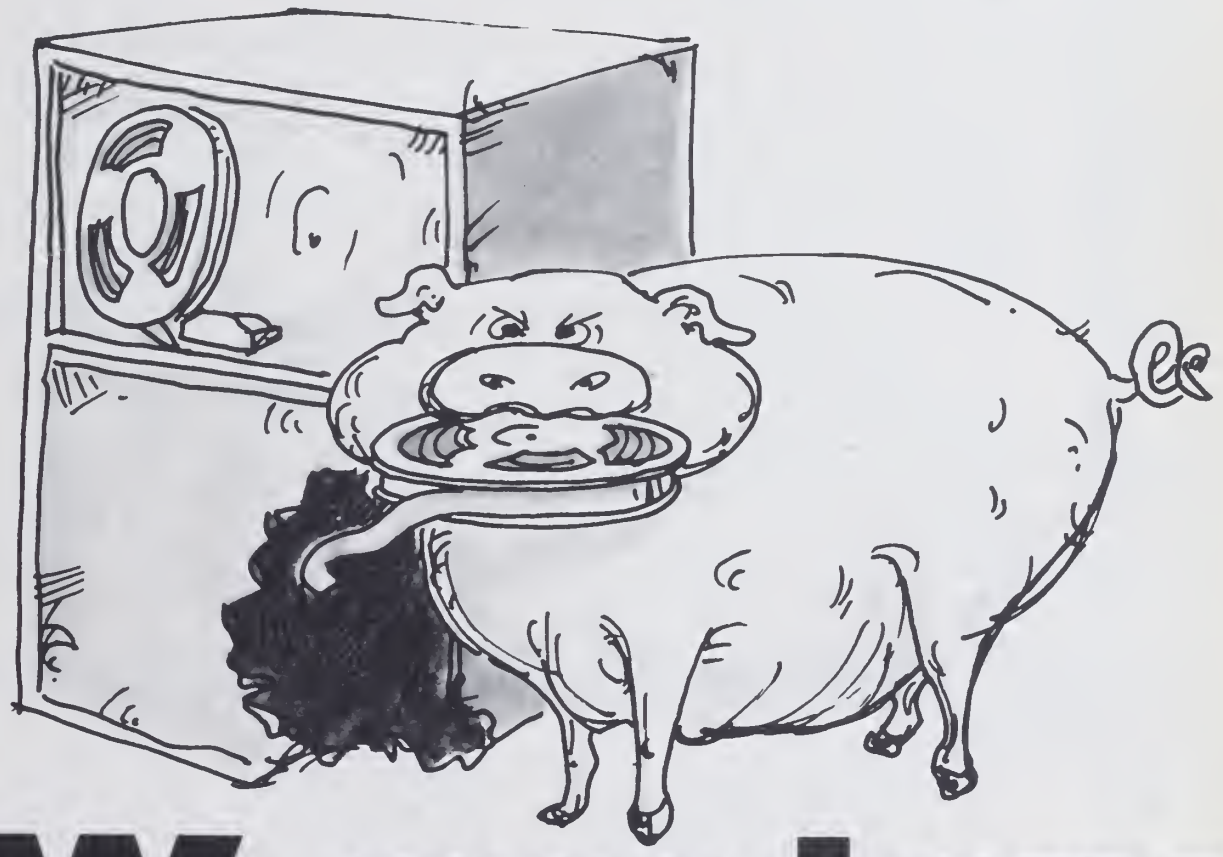
UCS 'Dissplа' Backs Graphics

KANSAS CITY, Mo.— Designed to produce two- to three-dimensional (3D) graphical formats, Dissplа from Issco is now available on the United Computing Systems, Inc. (UCS) network, according to a spokesman.

The software allows users to combine a range of standard features to create the desired output. Facilities include a variety of axis systems; a choice of alphabets, mathematical and cartographic symbols; 3D projection of "any" plot or surface from any perspective; and business plotting routines, the spokesman noted.

Dissplа output can be directed to a vector mode graphics device at the user's site, to devices installed at UCS local offices or to the large-scale graphics system at the data center here, the company said.

UCS is available locally in more than 140 U.S., Canadian and European cities. The network is headquartered at 2525 Washington, Kansas City, Mo. 64108.



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CIF Saves Bank Twice its Cost in First Year

SAVANNAH, Ga. — Ann Strickland sometimes feels like that appliance repairman in TV commercials who maintains his company's products are so trouble-free nobody ever calls him. He gets lonely.

Strickland is assistant vice-president and savings officer for First Federal Savings and Loan Association here. Her job as a troubleshooter puts her in direct contact with the bank's customers and branch offices. Her brow isn't exactly furrowed by cares associated with loneliness, but, she pointed out, the number of customers calling with questions or complaints about the handling of their accounts has dropped markedly since First Federal came forth with a new banking service that, in a way, answers questions before they can be asked.

She referred to the issuance of a consolidated year-end statement of deposits and earnings that includes all accounts held by the depositor, the amount of earnings for the current quarter for each account, the year-end balance, the next earning date and the amount of interest for the year to be reported on income tax returns. The statement, which reaches the customer just a few days after the previous year's books are closed, thus doubles as a year-end trial balance of all savings and a 1099 form for the data to be submitted to tax agencies.

The new combined statement was issued for the first time last January and as far as Strickland's concerned, it was the most successful mailing ever. "We didn't have any complaints about late mailings and the lack of such complaints is definitely a positive and encouraging development," she said. "I've also been told by employees in our branch offices that the absence of negative feedback from depositors allows them to work more productively, without a lot of telephone calls at statement time."

Postage Savings

Some customers have even complimented the bank for cutting costs associated with mailing the combined statements, she said. "Customers are obviously concerned with how judiciously the association spends money and it's easy for them to see that by combining all accounts and earnings on one statement and not mailing a separate statement for each account we are saving a substantial amount in postage and handling costs."

That savings adds up to nearly $19,000 a year, according to H. Tayloe Compton Jr., First Federal vice-president, whose responsibilities include computer systems design. "If we had handled last January's mailing the old way, we would have had to send out 39,085 earnings statements and an equal number of 1099 forms, making a total of 78,170 mailings," he said. "But by using the combined statement that contains data on all accounts held by the customer, including the 1099, we had only 25,641 mailings. That means a cut of 52,529 mailings.

"Add that to the 30,000 mailings avoided during the first three quarters of 1976 and you arrive at a total reduction of 82,529. Since we calculate our postage, form and handling costs at about 23 cents per item, it means that we saved an estimated $18,981.67."

Such a saving cannot be dismissed casually, even by a $260 million institution like First Federal. "With operating costs continuously rising," Compton said, "we have to be alert for ways to cut overhead if we are to retain the complete confidence of our depositors. The amount of money we saved in only one year with our combined statement is about twice what we had to pay for the computer program that made it possible.

Compton was referring to the Customer Information File software marketed by IBM as a Field Developed Program. That package ties all accounts to the appropriate customers' names and, in effect, makes it possible for First Federal to provide a total picture of customer-bank relationships.

The first step in applying the CIF program to the combined-statement concept was to begin issuing them for the next three quarters. The next step was to expand annual statements to include a comprehensive record of holdings and earnings, plus 1099 data.

When the time came last January to send out the statements, association employees were ready. Compton, who designed the combined-statement system and who spearheaded its implementation, recalled that preparation and mailing of 25,000-plus statements was accomplished over a three-day period.

Imagination and Know-How

What does it take to create a system that can do such an impressive job? It takes imagination and a knowledge of what the computer can do to speed up financial operations and save money. Ronald P. Weller, also a First Federal vice-president, had the idea of combining year-end statement with the 1099 and he sold it easily, largely because First Federal had previous DP successes in lending activity.

It also takes talented programmers to put ideas into action within a brief time frame and First Federal has that talent. In fact, bringing up the consolidated statement system required only one man-month of programming effort, using the old statement format but adding the requirements for combining it with the 1099.

Further, the specific need has to be identified and described. The system producing the combined statement did not result from a sudden, critical deficiency. First Federal had been getting information to customers promptly in one way or another for years through the use of the computer. There was, however, a strong feeling that customer service could be improved significantly by issuing to depositors one piece of paper showing their total relationship to the bank.

Another vital ingredient of success is upper management's support in getting such a project off the ground and into the implementation stage. N. Carson Branan, president and chief executive officer of First Federal, enthusiastically extended that support.

"I think that use of computer systems, such as the one that produces our consolidated statement represents the best way to achieve economy, even though the initial cost might seem high. If we had it to do over again, we would follow the same route."

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Decstation Software Enhanced

MAYNARD, Mass. — An enhanced version of the OS/78 operating system, including a commercial Basic, multifunction support and a printer-spooler program, has been introduced by Digital Equipment Corp. for the Decstation small business systems introduced late last spring [CW, June 2].

Built around DEC's VT78 terminal, which itself includes a PDP-8 minicomputer, the Decstation can be used in stand-alone operations or as a part of a network tied to a larger mini or a mainframe, a spokesman noted.

Basic Support

The Basic compiler supports commercial decimal arithmetic to 15-digit precision; a PRINT USING statement for formatted printing of numeric strings a record-oriented random-access method for data storage and retrieval; and multiple data formats, he said.

The multifunction facility permits parallel operation of tasks under a real-time activity in the upper 4K words of the Decstation's memory. Those tasks run concurrently with other functions — communications and I/O spooling, for example — occurring in the rest of memory.

The enhanced OS/78 will be a standard part of the Decstation and will be delivered in all units starting in May, the spokesman said. The current single-quantity cost of the small system, including a processor, dual floppy disks and the software, is $7,995.

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In Coast-to-Coast Circuit

Firm Uses Device to Cut Satellite Delay

By Ronald A. Frank
CW Staff

GERMANTOWN, Md. — General Felt Industries is one of the first users of a device provided by American Satellite Corp. (ASC) to eliminate propagation delays.

Called the Satellite Delay Compensation Unit (SDCU), this ASC-designed unit virtually eliminates the effects of the approximate half-second delay in signal transmission time over the 44,600 mile-long satellite hop. When using the SDCU, data can reportedly be transmitted between computers by satellite practically at the same speed as if they were connected directly.

General Felt, which transmits payroll, inventory and other business data between its offices in Los Angeles and Saddle Brook, N.J., "has increased data transmission speed, or throughput, approximately two and one half times," according to Bob Fredericks, General Felt's DP manager.

After several months of successful operation, General Felt now plans to install an additional SDCU in its Dallas office with a Data 100 Corp. Model 77 remote batch terminal. General Felt links together an IBM 370/135 in the company's main office in New Jersey with a remote job entry Basic/-Four Corp. minicomputer in Commerce, Calif., a suburb of Los Angeles.

The firm is now operating at 9,600 bit/sec using Paradyne Corp. modems on the satellite circuit. Initially, the satellite link was used for 4,800 bit/sec transmissions but traffic increased significantly so the speed was upgraded, Fredericks said.

When the company began coast-to-coast data transmission at 3,600 bit/sec, the effective rate was closer to 3,000 bit/sec because of the error rate and line turnaround. Because of the high error rates, General Felt was interested in trying something new, he said.

The SDCU available was attractive to General Felt because it used an error-correction principle that could cut down on the need to retransmit data, Fredericks said. On a satellite link, the SDCU transmits only the error blocks a second time whereas other methods retransmit an entire message that was sent after the point at which an error occurred. By retransmitting only bad blocks, effective throughput was increased, he explained.

Using the compensation unit, records can be blocked to cut down on retransmission, and thus retransmission factors are reduced significantly, Fredericks said.

The Model 135 CPU actually thinks it is talking to another CPU instead of the SDCU. In addition, the compensation unit has two buffers so that there is always a buffer full of data available when the line is ready to transmit, he added.

General Felt is paying about $1,100 for its coast-to-coast satellite link including the SDCU, while a comparable terrestrial facility from the phone company would cost about $1,800/mo, according to industry spokesmen.

The Model 135 at the New Jersey DP center operates under IBM's Basic Telecommunications Access Method (Btam) with an Integrated Communications Adapter (ICA).

TDMs Help Preserve Efficiency In Upgrade of Brokers' Network

NEW YORK — In an environment where a worldwide message-switching system connects 2,000 subscriber terminals of large brokerage houses with the major stock exchanges to conduct 15% to 20% of the total volume of trading on the New York and American Stock Exchanges, reliability is obviously important. When new clients were added to this network and its use grew, the Financial Services Division of ADP, Inc. faced a unique challenge in maintaining its system's reliability while upgrading capacity and performance.

Assigned to provide the software design for this message-switching system, Conversational Systems Corp. of New York incorporated intelligent time-division multiplexers (TDMs) in an important segment of the network.

To establish enhanced multiplexing capabilities for the upgraded network, Conversational Systems chose the System 4100/1 network processor from Western Union Information Systems. The device is a microprocessor-controlled TDM that supports a range of terminal devices over switched and dedicated lines. It handles asynchronous lines up to 1,800 bit/sec and is rated for operation of synchronous lines up to 9,600 bit/sec.

For the ADP network, Conversational Systems is "single-ending" these multiplexers. That is, instead of configuring the multiplexers in pairs at both ends of a synchronous circuit, the System 4100 synchronous line goes directly into a switch interface unit.

"We decided to introduce this multiplexing equipment into a portion of the network because the System 4100 meets our special needs currently and also provides capability for future expansion," according to Jeffrey Goldfarb, technical marketing vice-president of Conversational Systems.

"Use of the System 4100 is a first step toward greater flexibility in managing the

(Continued on Page 30)

U.S. Packet Nets Plan Datapac Link

WASHINGTON, D.C. — Both of the U.S. public packet networks have disclosed plans to interface with the Canadian Datapac packet network

Telenet Communications Corp. of Washington, D.C. said it will have rates to 55 Canadian cities "as low as $2.90 per hour." Two basic services will be offered: low-speed asynchronous to 1,200 bit/sec and higher speed synchronous to 9,600 bit/sec, using the CCITT X.25 interface protocol.

For Canadian-U.S. calls, connection will be 90 cents per hour plus $3 to $7.50 per kilopacket depending on location. For U.S. calls to Canada, connection will range from $1.80 to $4.20 per hour depending on city plus $1.10 to $5.60 based on destination.

Tymnet of Cupertino, Calif., said it will offer 110- to 300 bit/sec service, with Canada-to-U.S. charges ranging from $4 to $10 per hour and U.S.-to-Canada rates ranging from $4 to $6 per hour.

Tymnet will begin March 22, while Telenet said it will start service on Feb. 22.

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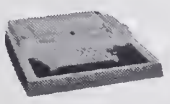

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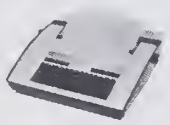

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TDMs Keep Efficiency High in Net Upgrade

(Continued from Page 29)

network beause it concentrates multiple communications lines into a single network for more efficient handling by the switching computer," he said.

In redesigning the network for ADP, Conversational Systems found that growth and changing customer requirements posed several major problems.

First, the financial community was moving toward higher speed communications, and ADP wanted to provide clients who were interested in phasing out low-speed equipment with this capability. This meant enhancing certain aspects of the ADP network to handle the higher speed equipment.

Second, research studies* indicated that sufficient expansion of the original message-switching computer (dual IBM 1130 systems) would not be cost-effective. As more customers joined the network, the number of lines increased.

Also, line costs rose as a growing number of subscribers were located far from New York. Yet continually adding equipment to the existing network architecture in order to sustain growth and maintain service quality was becoming more and more expensive.

An increase in lines added another problem: Efficiency of the system was threatened. Adding more equipment to the existing network was becoming more harmful to overall system reliability.

The 4100 was chosen in part because it handles higher line speeds some customers might require for their terminals. Jack Gostl, vice-president for communications at Conversational Systems and project manager for the design of the ADP system, said, "Because the System 4100 concentrates 20 lines into one, it has increased throughput capabilities of the switch. And because we can modify the ways the concentrated lines are serviced, we can reduce overhead and permit a larger number of lines to be handled without overburdening the CPU. "With the System 4100 taking some of the load off the CPU, we can service more lines on each system," he said, "and the overall hardware and operating cost of the system on a per-line basis is reduced. Comparing this switch with other existing switches and front ends, ADP has achieved a lower cost per line while maintaining high throughput rates."

"In addition, being able to isolate system faults, we have a more manageable system and gain greater network control," Gostl said.

The System 4100 is maintained by Western Union Information Systems' nationwide service. Downtime for the system is reportedly minimized when problems do occur, because the 4100 design relies on board replacement.

Switch Operation

Today the general-purpose switch handles 10 messages a second with a total turnaround time of less than 1.5 seconds on 90% of the messages. The switch uses dual Digital Equipment Corp. PDP-11/70s, one for backup, with RP04 disk storage and acts as a front-end processor to an order match system at ADP (dual IBM 370/158 computer system in New York). The 2,000 terminal stations tie in to the switch with 300 subscriber lines.

The system transmits administrative traffic between terminals and the stock exchanges and also stores and forwards information for retrieval. Orders entered by the various broker subscribers are collected, transferred into the IBM 370 for order matching and sent back to the switch for forwarding to the floor of the proper stock exchange for execution or to other computers in the network.

Normally, System 4100 multiplexers would be used in back-to-back configuration with terminal traffic coming into one System 4100, transmitted via a synchronous communications line with special System 4100 communications protocol. At the remote location the traffic would be demultiplexed in the other System 4100 and presented to the processor.

However, Conversational Systems is instead "single-ending" the units, so that the synchronous communications line of each System 4100 goes directly into a DEC interface, and the messages are demultiplexed in the switch. Two 4100s handle up to 20 subscriber lines each and a third unit backs up the other two.

Concerning future enhancements and network growth, the multiplexers fit in with prospective expansion for the ADP network in several ways. First, according to Jeff Goldfarb, additional cost savings are possible. In addition, remote locations of the 4100 units in the network can further expand system cost-effectiveness.

"If ADP starts using the System 4100 in remote configurations, there will also be an increase in the system's ability to economically handle remote subnetworks for clients," he said.

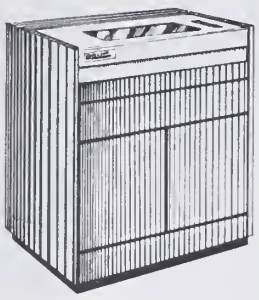
"These independent subnetworks can also be implemented through the central switch, with subscribers exchanging messages in complete security. This will mean there will be more efficient ways to use the network facilities, and therefore a higher degree of service will be available to ADP customers," he added.

Enhancement of the System 4100 could also provide greater error correction capability, Goldfarb said. Future ADP network plans call for enhancement of the communications protocol so the System 4100 can be buffered.

The Printer Store

Digital Associates Corporation

Or, switch to ChainTrain quality.



The DAC CT 6644 is a 600 LPM ChainTrain printer that replaces LP11-YA.
It gives letter-quality printing, and costs about 40% less than DEC's 600 LPM drum printer.
Again it comes with PDP-11 interface, installation and maintenance.

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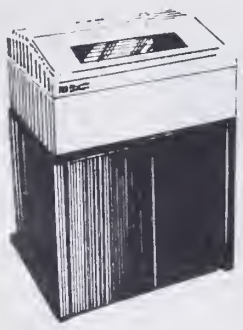

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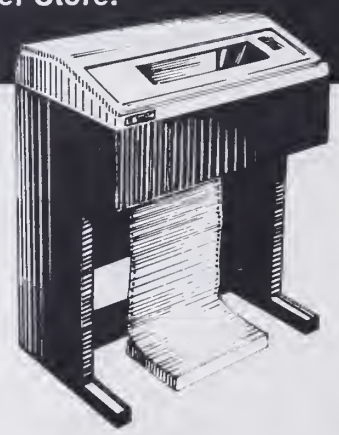

You can save 40% on your LP-11 printer costs. The DAC-2260 is a 600LPM plug-to-plug replacement for your LP11-YA.Or, for 25% less than DEC's 600LPM printer, we offer the 900LPM, DAC-2290, plug-to-plug replacement for the LP11-CA. And they both come with PDP-11 interface, installation and complete maintenance service. Whether you buy, rent or lease, you still save.

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Hazeltine

Multiline Buffer Added by BPI

MIAMI — The BPI Model 8 multiline buffer reportedly permits CRTs and other RS-232C compatible terminals to be located up to 4,000 feet from a CPU without the use of modems.

The Model 8 includes eight buffered lines that permit buffering of up to four terminals. The Model 18 includes 18 buffered lines conforming to signals described in the EIA specification, the firm said.

Both units carry a full-year warranty, BPI added.

The Model 8 is $149, and the Model 18 costs $195. BPI Electronics, Inc. is at 4470 S.W. 74 Ave., Miami, Fla. 33155.

GE Teleprinter Operates to 1,200 Bit/Sec

WAYNESBORO, Va. — The Terminet 1232 teleprinter, featuring 132 columns, designed for use at rates to 1,200 bit/sec and including a 1K buffer, has been announced by the General Electric Data Communication Products Business Department.

This Terminet belt printer device makes use of the same rotating belt principle developed a decade ago for the Terminet 300 printer. The rotating print belt utilizes a 510 char./sec hammerbank mechanism which has a hammer for each print position. All 128 Ascii characters may be generated from the standard Ansi four-row keyboard, the firm said.

The Terminet 1232 printer uses a replaceable Mobius loop ribbon cartridge, a device introduced by GE nearly three years ago. The cartridge contains 65 yards of 3/4-in. ribbon.

The Terminet 1232 printer is available in keyboard send-receive (KSR), receive-only (RO), automatic send-receive (paper tape) or magnetic send-receive (magnetic tape) configurations. The KSR stands 38 in. high, 26 in. wide and 34 in. deep and weighs 166 pounds.

Front or rear paper handling is a standard feature, while six-pin tractors handle one- to six-part forms. Paper widths from 3- to 15 in. can be accommodated, the company said.

Horizontal tab and vertical formatting are standard with 10 char./in. horizontally and six line/in. vertically. Operator-selectable six or eight line/in. is optionally available. Speeds are switch-selectable at 10-, 20-, 30-, and 120 char./sec.

Optional features of the Terminet 1232 teleprinter include numeric cluster, answerback, 20 mA interface and line control. APL character set and keyboard are also optionally available as is a bridge-mounted single or dual magnetic tape accessory or side-mounted paper tape reader and punch, GE said.

The Terminet 1232 printer costs $5,155 and lease plans are available from Data Communication Products Business Department, Waynesboro, Va. 22980.

Unit Monitors Data Circuits

RIDGEFIELD, Conn. — Digitech Data Industries, Inc. has announced the availability of the Pacerscope, a CRT monitor with programmable control for diagnosing data link failures.

The Pacerscope has been designed to provide "a clear window" to a data communication circuit from the RS-232 interface. The user can reportedly view all data in real time up to 9,600 bit/sec (full duplex) or selectively filter data to show only those portions of diagnostic interest. Offline it will display thousands of characters to permit analysis of recorded data, Digitech said.

Software control, coupled with visual enhancements, provides for viewing data between the occurrence of two distinct events. For example, the user may observe data from one or any number of CRTs in a multipoint drop. In addition, the unit will display special operator messages, prompt alarm conditions, any time measurements, event counts (up to four separate events) and special symbols, all of which permits recognition of data stream conditions, the firm said.

The Pacerscope is available with a 9-in. tabletop CRT for $2,500 or a 14-in. rack-mount CRT for $2,600 from Digitech Data Industries, Inc., 66 Grove St., Ridgefield, Conn. 06877.

Telecom Serving Datapoint Users

ALEXANDRIA, Va. — Users of Datapoint 3000, 3300 and 3360 CRT terminals, which were discontinued by the manufacturer in late 1977, can obtain refurbished units, parts and service from Telecommunications Services Co. (Telcom).

Telecom also offers updated features for the Datapoint terminals, including scrolling on the 3370, higher transmission rates (to 9,600 bit/sec), 20 mA loop and a variety of smaller convenience changes on the Datapoint dumb and editing terminals. Telecom is at Box 4117, Alexandria, Va. 22303.

ATTN: 3270 USERS

Here's a *tailor-made* system to fit the requirements of your job today. In addition, BRAEGEN's multi-tasking intelligent controller offers the flexibility you will require in the future. **Systems Programmers,** in particular, find the following features very valuable.

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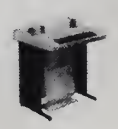

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Notion Firm Alters Order, Inventory System

NEW YORK — Lidz Brothers, Inc. is realizing internal breakthroughs with DP techniques that are sophisticated in design but simple for the user.

Inventory has been reduced 40%, while billing run time has been slashed 80%. Cobol programs written by an employee are running smoothly on a Univac 90/30 system together with Uniscope 200 CRT terminals and using a special software program known as Information Management System/90 (IMS/90).

Lidz Brothers is one of the major suppliers of buttons and other sewing notions in the U.S. Marketing is handled by two divisions: One sells to apparel manufacturers while the retail division services a variety of retail customers including department stores, variety stores, chain stores and fabric shops.

In the past dozen years, the company has gone from using keypunch machines to the Univac 9200 CPU (first a card system and then disk-oriented) and finally to the current Univac 90/30.

Data Entry Upgrade

Data entry precision was achieved by a changeover from conventional keypunch units to Uniscope 200 display terminals.

Lidz receives several hundred orders daily, each containing about 50 line items. The orders come in various forms — reminder cards from the display racks at the stores, customers' formal purchase orders, telephone messages and written orders from the sales offices.

The first operation is to log the orders manually and code them with customer and store number plus exception handling instructions. Previously, the various order forms were used as input media by keypunch operators. They would punch the customer and store number into an 80-column card which, when entered into the system, caused the shipping billing information to be accessed from the master file stored in disk memory.

The present procedure, using Uniscope 200 terminals connected to the 90/30, enables data to be directly entered or accessed in any sequence. The terminal operator, novice or experienced typist, keys the customer and store number from an order form which causes the full shipping and billing information as well as the keyed informatin to appear automatically on the terminal display screen. The balance of the order information is then keyed and displayed.

With the complete order visible on the screen, the operator is able to visually validate the order, key any update or correction and visually verify the changes made.

This procedure produces accurate shipping documents. But in addition, it saves in valuable CPU time and in equipment cost because the terminals cost less than keypunch units.

An on-line billing application written in Cobol reportedly prepares data in 20% of the time taken previously by the keypunch procedure. The program was written by a man with no formal training in Cobol, Lidz said.

The billing method is based on the existing order entry files. The entering of billing data into the system via the on-line CRTs and the editing and validation were simplified by the maneuverability of data on the video screen.

Changes Simplified

Prior to the use of the terminals, copies of the picking tickets were routed to the keypunch stations. Operators would punch a finder card including all the pertinent information about each order. Any last-minute changes in quantity and their effect on price and discounts would also be punched.

The cards had to be verified and the information edited for correct items and quantities. This accummulated a lot of keypunch time and card volume.

Now, when the picking document comes from the warehouse, the operator keys in the customer and log number on the terminal and the name and address appear on the screen.

The operator selects the order for billing, fills in a formatted screen with detailed changes to items (price, quantity, deletions, etc.). The operator calls another formatted screen which allows overriding master file information such as terms, discounts, salesmen, etc. and the inclusion of shipping data and comments.

While this procedure allows for the changing of the entire order via the Uniscope 200, most orders are billed as ordered.

The editing procedure is simplified by automatic queries and instructions that appear on the screen. The screen asks for order numbers, shipping instructions, changes, and comments, so that even inexperienced personnel can handle the procedrue.

In addition to developing the new order entry and billing systems, the DP department of Lidz Brothers is changing to a management information center. The use of Uniscope terminals in the on-line mode of operation makes this change viable.

A complete inventory management application, using by-product data

(Continued on Page 38)

A SECOND "OPEN LETTER" TO THE

UNDER-EMPLOYED

COMPUTER INDUSTRY PROFESSIONALS....

THE GOOD NEWS...
is that the Computer Industry has an overwhelming need for innovative professionals and for middle and upper management talent.

THE BAD NEWS...
is that the Computer Industry, driven by a never-ending need to invest in technology, is not investing heavily enough in the professional and economic growth of its people. All too often, the **BEST JOBS**-the high responsibility, the high visibility, the high paying jobs—are given to **OUTSIDERS.** Unfortunately, economic and professional growth must often be attained through the JOB-HUNTING process.

MORE BAD NEWS...
If you've tried Job-Hunting, either casually or aggressively, during the past several years, you appreciate that there is **NO EFFECTIVE SYSTEM** for identifying the **BEST JOBS**. The conventional techniques, if they work at all, yield jobs that are beneath your capabilities, that pay less than you are currently earning, and/or provide little upward mobility. If you've tried the conventional techniques, you know how ineffective they are—

- Contacted Industry Friends
- Answered Advertisements
- Written to Company Presidents
- Contacted Search Firms
- Contacted Employment Counselors
- Contacted Employment Agencies

Use of these **CONVENTIONAL TECHNIQUES** has probably caused you to assume that there are no good jobs available, or assume that you aren't qualified for better.

You've probably decided to wait for the next reorganization to see how you fare. You have decided to wait...and wait...and wait for someone to call you with a job offer.

SO, WHAT'S WRONG??
If the Computer Industry really needs innovative professionals and needs middle and upper level managers...and if you are **UNDER-EMPLOYED** in your current company, why aren't you being "wooed" by competitive firms?

The answer, we believe, is that there is no effective and selective way for you to learn of opportunities for the **BEST JOBS** and there is no way for you to make your availability and interests known. There is a **BREAKDOWN IN COMMUNICATIONS!**

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Mexican User Banks on Independent Modems

MEXICO CITY — A network based upon IBM's System Network Architecture (SNA) concept and utilizing an independent's licensed 1,200 bit/sec and 2,400 bit/sec CCITT-compatible modems is now in use at Multibanco Comermex here.

A requisite of the net was a greater integration of the bank's offices throughout the country over a reliable data transmission system. Once the network was established, Multibanco Comermex decided to install backup systems both at the mainframe and in the telecommunications equipment. The use of distributed intelligence technology was supported by a high-level synchronous communications protocol.

One of the bank's objectives was to use modems manufactured in Mexico. This objective was achieved by contacting the General de Telecomunicaciones S.A., which supplied modems manufactured in Mexico under license from the Vadic Corp.

Two types of modems were licensed from Vadic: the VA1200L CCITT V.23-compatible 1,200 bit/sec modem and VA2400L the CCITT V.26-compatible 2,400 bit/sec modem.

The network is supported in a DP center and a data telecommunications center here. Multibanco Comermex also offers a verification and screening through telephone service back-up to remote and branch offices, in case of a catastrophic failure such as a power outage at a remote office.

Installation of controls for remote terminal management of provincial branch offices has been planned, and integration of remote offices in the country's interior has already been started.

The Multitronic network, based on the IBM 3600 financial terminal system, includes IBM 370/125 and 370/135 computers and two IBM 3704 communications processors to provide complete backup for the on-line operation. Normally, the 135 is used on the first and last days of the week and on pay days (15th and 30th of the month).

Each 3704 front end is capable of managing the entire network, because of data divider bridges, following the VA2400L modems. The bridges accept four 3600 terminal controllers backing up both the 1,200- and 2,400 bit/sec modems, which are housed in 16-channel multiple mounting racks.

At present, the system has 46 branches, most of them in the metropolitan area of Mexico City. The system contains 140 data terminals linked by the Vadic-licensed 1,200- and 2,400 bit/sec modems.

The 1,200 bit/sec modems are used at the branch level, while the 2,400 bit/sec modems are used at the DP center. The system is used for debits, credits and verification on checking and savings accounts and financial mortgage loans.

Kit Eases Design Of CRT Output

NEW YORK — Magic Chart, Inc. has introduced the Terminal Layout Chart for the design and testing of output intended to appear on CRT screens.

A layout chart kit comes with one 11-in. by 11-in. mylar sheet, two marking pencils, one marking pen and an eraser. The layout board also comes with an 11-in. by 11-in. white vinyl sheet and two marking pens.

The kits cost $25 each, for either the mylar or vinyl versions. Quantity discounts are available for three or more kits. Magic Chart is at 25 Broad St., New York, N.Y. 10004.

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DatagraphiX® and Characтron® are registered trademarks of DatagraphiX, Inc.

With 90-Day Minimum Lease

ATL Has Terminals for Short Term

BOSTON — American Used Computer Corp. has launched the American Terminal Leasing Co. (ATL) to provide users with short term (90-day minimum) leasing of new terminals as alternatives to outright purchase.

Most leasing companies will lease terminals only for a year at a time and insist on the continuation of the lease for a minimum of another year if the user still needs the equipment, ATL said.

A recent ATL survey, reportedly found users need considerably more flexibility, especially when they are expanding and testing communications applications. Most of these trials last less than a year and burden the user with extra months of the lease as a hidden penalty to the fixed one-year term, ATL said.

Terminal Transactions

Another user consideration is the continual upgrading in many hard-copy applications. Here users start off with a 10 char/sec. Teletype, upgrade to a 30 char./sec Digital Equipment Corp. Decwriter II and next step up to the Decwriter III with 180 char./sec. The user often needs the Decwriter II for 18 months or so while he upgrades his CPU to more power, according to ATL.

In these cases, the outright purchase of hard-copy terminals is uneconomical and the residual values of the terminals subject to high depreciation risk because terminal technology is rapidly changing, ATL said.

With terminals such as the Decwriter II, the addition of microprocessors will eliminate or reduce computer transmission requirements, the company noted. A user seeking to take advantage of the advances that will be coming within the next 18 months will be at a disadvantage if he purchases terminals today, ATL said.

ATL will lease both Decwriter II and Decwriter III terminals for 90 days with all options available. The leases are also available with an option to provide maintenance directly from DEC, even for 90-day leases.

The Decwriter II (LA36) costs $80/mo on a 90-day lease while the Decwriter III (LA 120) costs $160/mo for the same period.

At the termination of the lease, a user can continue on a month-to-month basis or a one-year lease can be written for $60/mo and $120/mo.

Delivery is immediate from ATL at 712 Beacon St., Boston, Mass. 02215.

Firm Alters Order System

(Continued from Page 36)

from the order entry and billing runs, provides management with information to closely control stock status conditions and make well-advised purchasing decisions. These reports also identify merchandise sales trends for the judicious adjustment of product lines.

Over the past six years, the reports have been modified and improved on a continuing basis producing an inventory much better balanced in terms of demand while paring down the number of out-of-stock situations. As a result, a continuous improvement in profitability is being realized. Moreover, there has been a reduction of more than 40% in inventory carried over the past two years, the firm claimed.

For the near and distant future, Lidz Brothers plans to continue sharpening its DP systems to further improve the company's response to customers needs. A computer-generated purchasing system with a related accounts payable application are on the "to-do" list. An on-line inventory project is to receive concurrent attention and development. This project will introduce more time savings by obtaining a much wider variety of information in response to terminal inquiries and will almost eliminate the clerical work in this area, the company noted.

Teletype 40, CPUs Linked

HOUSTON — The 200- and 300 line/min versions of the Teletype Corp.'s Model 40 line printer can now be linked to computer mainframes with an interface from Tel-Tex, Inc.

The Model Universal Parallel Interface generates a universal handshake routine, permitting the replacement of existing line printers with similar operational specifications, Tel-Tex said.

Features include a print-stop switch to interrupt printing on two of several selectable control codes. This permits an operator to make required service of forms or other duties without stopping the computer program.

The unit comes with either manual or automatic control of printer motor. The printer can be turned on or off by the user or by control codes in the data stream.

The Universal Parallel Interface has the capability of utilizing a Tel-Tex furnished buffered serial interface. This permits a serial data flow in TTL, EIA or 20mA current-loop modes and allows the use of the line printer as a remote peripheral receive-only device.

The Model 40 and interface cost $5,750. The interface alone is available for $900 from Tel-Tex at 3203 Audley St., Houston, Texas 77098.

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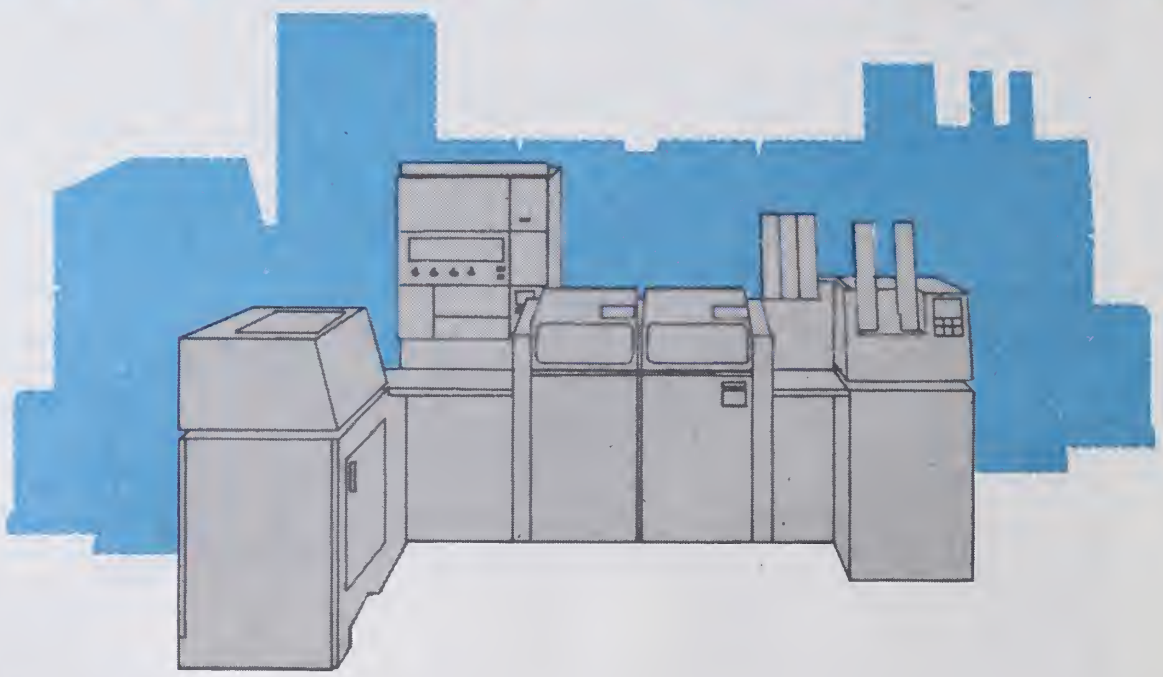

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Sought by Users, Managers

COM Receives Boost From Two Sides

By Frank Vaughan
CW Staff

SAN DIEGO — Decisions concerning computer output microfilm (COM) equipment often result in paradoxical situations in which both users and management push DP managers to install it, according to William Porter, director of marketing for Datagraphix, Inc., a manufacturer of COM systems.

"COM is an inexpensive peripheral system from the point of view of total capital outlay, but the savings which can be derived from its use can be quite significant. So, if users look at the savings, there is a high priority for its installation," he said in a recent interview."

"If the DP manager has received from his management the task of bringing on new applications, installing a new on-line system or putting some highly sophisticated DP techniques, he will give these tasks a top priority and assign a systems analyst to the jobs because these tasks are carrying a big price tag.

"COM is low on the list because it is only going to cost $100,000. But COM could derive tremendous savings, so the man at the top may see that quicker than the DP manager does," he continued.

"Also, the user may be the force that drives the DP manager. He may say 'Hey, I went to a meeting the other day and some of my colleagues in the industry were using COM. Why don't you give me COM?' " Porter suggested. If the user likes COM, the DP manager is going to be forced to get it, he forecast.

Likely Candidates

Who is likely to become a first-time user of COM? There is no clear picture of that user, according to Porter. "In general, he's got a computer, of course, although there are some users who don't have a CPU. They are using a service bureau which in turn uses a COM service bureau or has COM," he noted.

Historically, the vast majority of COM users have had a computer, typically a large-scale system, until the last couple of years. Now, however, COM users sometimes have medium-scale computers or even small-scale computers, he explained, adding "there are at least two [Digital Equipment Corp.] PDP-11s that I know which are driving COM.

"So now, the first-time COM user generally has a computer in the range of the IBM 370/135 and up, and is printing or has the applications available to print on COM between 200,000 and 500,000 [pages] a month. There are exceptions to these quantities — for example, people who have tremendous distribution problems of a smaller data base," he said.

One of the advantages of COM

(Continued on Page 42)

Taxable? It Depends

By Frank Vaughan
CW Staff

SAN DIEGO — Is computer output microfilm (COM) that gets produced by a service bureau subject to sales tax?

The answer is more complex than one would imagine, according to William Porter of Datagraphix, Inc.

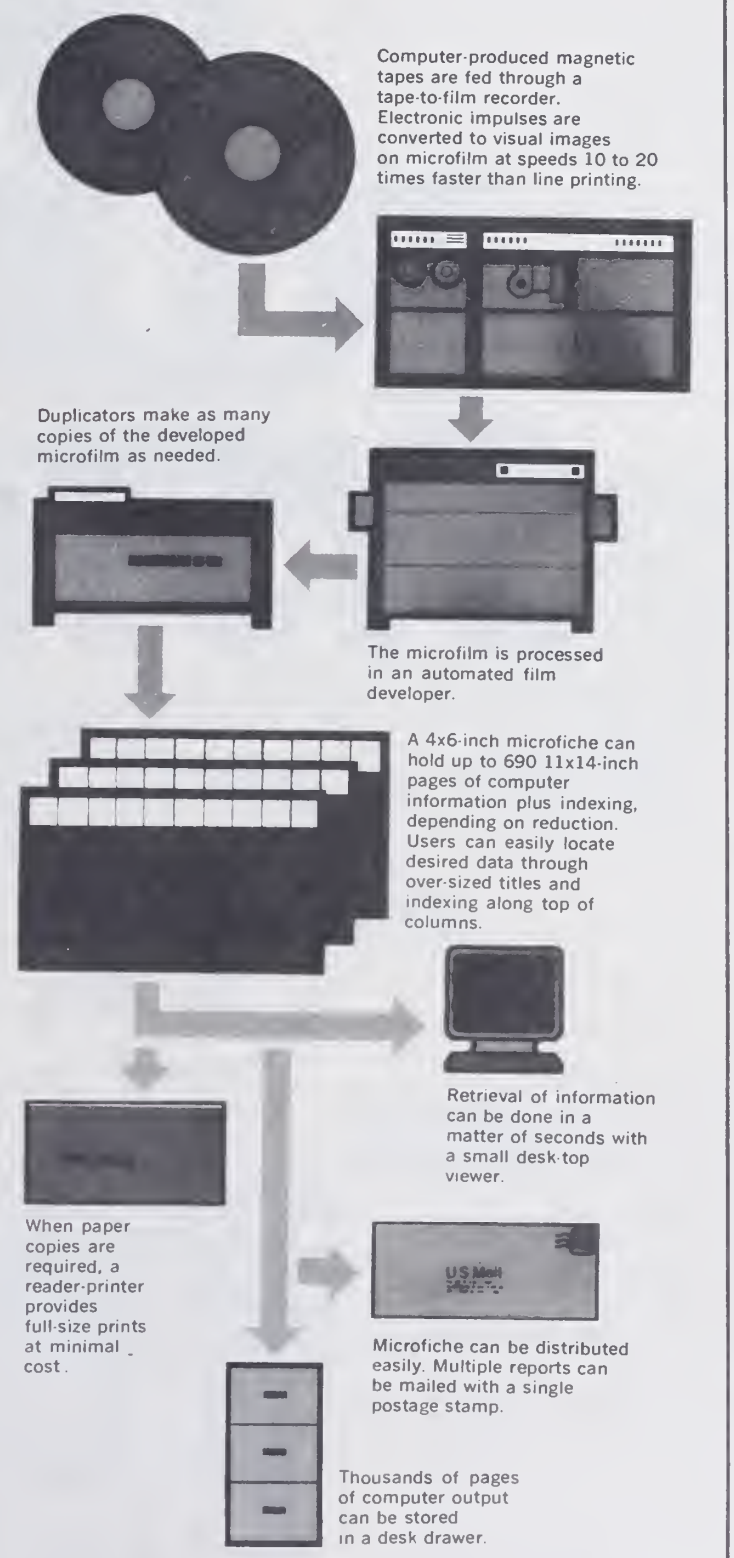
"COM output, on microfiche, that I sell to you is taxable in some states and not taxable in others," he explained.

"In California, if you give me a data tape and I give it back to you in the form of a microfiche and give you your tape back, it's not taxable unless I did it with a minicomputer.

"In other words, if you give me a tape that is already formatted to give the titles, and indexes and the fiche breaks, and I just run it on my COM recorder and give you back microfiche and your tape — it is not taxable.

"But if you give me a raw data tape and I format it with indexes and titles — it's taxable," he observed.

How COM Works



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Saves $2,000/Mo Over Keypunch

Data Entry User Likes Revolutionary Evolution

SALEM, Ore. — In the 20 years that George LeTourneux has been involved in DP at the State of Oregon's Highway Division, he has seen a revolutionary evolution. "Devices that we used to dream of 20 years ago have come and gone," he recalled, "only to be replaced by more sophisticated, more cost-effective machines."

From the Highway Division's first IBM 650 computer to its latest, a 370/158, LeTourneux has seen more and more processing power placed into smaller and smaller packages. At the other end of the line, the same telescoping has occurred: he recently installed a multifunction key-to-disk system in the Salem office, replacing two separate systems — a Remcom remote job entry station and Univac 1701-1710 keypunch and verify machines.

As a result, the Highway Department is saving $2,000 a month in equipment and card costs, LeTourneux said.

Besides the cost effectiveness of the system, LeTourneux is also getting cleaner, more accurate data for fewer keystrokes, he said. And less work for the data entry operators means they can be more responsive to the growing needs of the various user groups in the department that LeTourneux, director of DP, and his staff serve, he noted.

Great Variety

"We work, in effect, as a service bureau for the Highway Division," LeTourneux explained, "and while there is not a great volume of data on any one application, the work is characterized by a tremendous variety of applications to be entered."

There are, he estimated, "500 different screen formats with up to 99 levels each." The formats are now stored on the Data 100 Corp. Keybatch system's 5M-byte disk, where any of the 12 operators access them independently via their 256-character CRT terminals.

Operators no longer have to file through a full tray of cards to find the correct format; the system does it automatically after they key in the appropriate job number. As they begin entering the source document data, the system "prompts" the operators' answers and guides them through data entry.

While one operator accumulates historical records of construction bids for a highway cost analysis project, for example, another enters traffic data so engineers will know the time and prevailing conditions when accidents occur and be able to take corrective action.

A third operator might key in transportation study information to help determine the location and volume capacities for future highway construction while a fourth updates information on parks, visitor registration and playground and recreational equipment.

Data Kept 'Logical'

At the same time the data is being entered, it is also being edited to ensure it is within the range of conditions preprogrammed by LeTourneux's staff. Besides the routine alpha and numeric features, there are checks to assure that, for example, the data entered on gallons of gasoline used by the department's fleet of trucks is in the range of logical quantities.

The system also performs other editing functions. A table lookup, for example, can either verify that work crew numbers for cost accounting are valid or that an employee's Social Security number is correct.

Range checking ensures that work data entered on personnel who pave or stripe Oregon's highways is within range; if an operator entered, for instance, that 1,000 miles of road had been paved one day, that would constitute an "out-of-range condition."

"Now we are sure that the data flowing through our CPU is relatively free of errors. The problem with keypunch and verify systems, even the best ones, is that you can still verify bad data," LeTourneux noted. "You can clean up the data entry process, but the actual data may still exceed the standard parameters for a particular item.

An Error is an Error

"So while it's not a data entry error, because it reflects the amount shown on the source document," he explained, "it is, nevertheless, an error. If an error should occur, the Keybatch system automatically stops and displays the error for the operators so they know right away if the data is good."

Despite all the advantages of the key-to-disk system, the prospect of changing was an unsettling one for the keypunch-oriented operators. To alleviate some of their fears, LeTourneux programmed the system for card format key entry — so that Column 27 became position 27, etc.

As soon as the operators became comfortable with the system, edit features were added, constants were eliminated, formats were compressed and productivity increased.

At the same time data is being entered, the Keybatch system is performing concurrent background tasks such as communications, printing or spooling to tape for backup, he noted.

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Telefile Mass Storage Facility Built for Xerox Sigma Systems

IRVINE, Calif. — A mass storage facility for Xerox computer systems is available from Telefile Computer Products, Inc.

Designated Matchmaker II, the facility is built around a device controller, disk drives and tape transports to provide billions of bytes of mass storage, the firm claimed.

Through firmware and interface changes, the hardware can be adapted to any future combination of operating system, host CPU and storage media, a spokesman added.

The Telefile mass storage facility is plug-compatible with any Sigma 5 through 9 computer and can be expanded in modular increments. Up to eight devices can be connected to a single host CPU through the Matchmaker II.

Winchester Modules

For maximum fast-access storage, 317.5M-byte Winchester technology storage modules would normally be specified. Also available from Telefile are IBM 3330-type drives with 80M, 100M, 200M and 300M bytes of storage.

These units can be combined in any mixture along with 800/1,600 and 1,600/6,250 bit/in. tape transports to serve as on-line active or off-line backup storage. Disk-to-tape and tape-to-disk transfers can be accomplished on-line or off-line, the spokesman said.

Separate Ports

The mass storage facility has a separate controller "port" for each spindle or tape transport. This radial or star interface isolates each device, increasing the reliability of the system, the spokesman claimed.

Several different Device Interface Modules can be attached to a single Matchmaker II controller at the same time, Telefile said. Each module provides the addressing and control logic needed for a particular type of device. Separate driver/connectors are then added for each disk spindle or tape transport.

32K Buffer

The mass storage facility also features a 32K byte buffer that can be expanded to 128K (16-bit) words.

A minimum Matchmaker II system with one controller and a single 635M-byte dual-disk unit costs $77,880 from Telefile at 17131 Daimler St., Irvine, Calif. 92714.

Dema Meeting Regionally

GREENWICH, Conn. — Three regional meetings of the Data Entry Management Association (Dema) have been scheduled for early this year. The first, in Houston, will kick off Feb. 16 at the Galleria Plaza.

Other regional meetings on the books include Washington (March 30-31) and Columbus, Ohio (May 11-12).

The regional meetings, which are not restricted to members of Dema, are designed to help people in data entry operations grow professionally in a hands-on, informal atmosphere, according to Norman Bodek, president

The day and a half schedule will include speakers and problem solving workshops and will provide an opportunity for data entry professionals to meet and exchange information and ideas, Bodek noted.

The price of the seminars is $125; preregistration forms and other information is available from Dema, 16E Weavers' Hill, Greenwich, Conn. 06830.

Users, Managers Boosting COM

(Continued from Page 39)

is that a user can make as many high-quality prints as he wishes, Porter noted, so it is possible for someone with small printing jobs and big distribution problems to justify a COM unit on less than 100,000 original pages a month.

"Banks fit both bills," Porter noted. "They have large numbers of pages and large distributions. Of course, they are currently the largest users of COM. Then, there are some retrieval problems that COM can solve," he recalled. "In the beginning we used to say that a user had to have so many pages a month to justify COM, but now we say the user has to have so many pages, or a distribution problem or a retrieval problem that we can solve. If that is the case, then the number of original pages is no longer the only justification."

Selection Process

The first-time user's selection process for COM is somewhat different from that for other mainframes and peripherals, Porter suggested.

"At this stage of the game, a large portion of the responsibility in the selection process falls upon the vendor, in that the COM industry is not as large as the computer industry. There are just not large numbers of users groups to which the prospective user can go for information. We do have users groups, of course, and they are valuable but not to the extent that the computer business has them. Therefore, the vendor has a large responsibility in the user's selection process," he explained.

"So, the DP manager is pretty well going to have to have the help of the vendor in making an evaluation unless he is in one of the large industries using COM — such as banking, where all he has to do is pick up the phone and call his neighbor," he said.

"What we would suggest to the user is that he go to a consultant; there are some good consultants to help him evaluate COM," Porter said, adding that the user should ask vendors about references and large applications.

"Probably the best solution is the reference approach," he explained, "because he can find a pretty good amount of written material on how to evaluate COM. There are four or five good books and there are 400 to 500 articles available to read about COM."

The fundamental things he has to consider are the economics of installing COM and the user satisfaction. User satisfaction is the key to it. If he accepts the microfilm data and he can see the economic savings, he will probably opt for a system. The DP manager must also look at archival requirements, distribution of data, turnaround, data security and efficiency.

"But basically, ther are two things to consider: whether he will save money and whether his users will accept the data happily and get the job done more effectively," he said.

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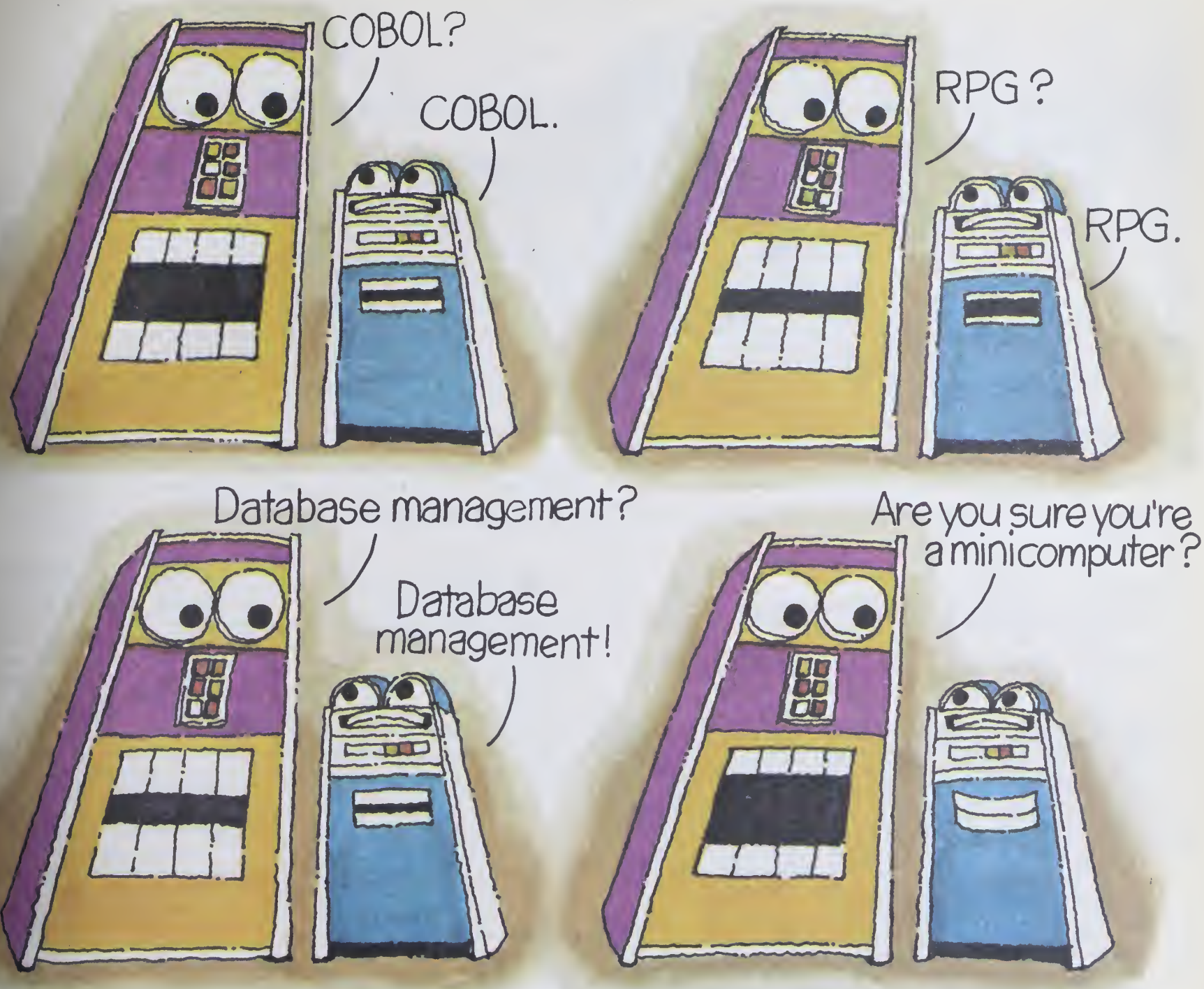

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digital

The Carle Clinic is now providing faster service for patients since it doubled the capacity of its IBM 370/125 with independent add-on memory.

With Add-On Memory, Clinic Gets the Flexibility Needed to Serve Patients

By Tim Scannell
CW Staff

URBANA, Ill. — The Carle Clinic Association here was reportedly able to extend the services it provides to the more than 390,000 people who annually visit the clinic after it doubled the size of its IBM 370/125 mainframe with independent memory.

The clinic, utilizing the flexibility of the expanded memory, has also boosted the number of its terminals from 38 to 85, according to Edward J. Beranek, DP manager for the association. "Terminals are an important part of our business, so that's where the difference is most visible," he noted.

Intel Corp. was the only non-IBM vendor taken into consideration as the add-on memory supplier, Beranek added. The In-7125 was selected because of its lower cost in comparison with an IBM upgrade, he said.

However, any additional memory would have proved to be acceptable, he pointed out. "We would have had an improvement no matter whose memory [we used]. We were so degraded because of our lack of available memory that it was just a case of our being out of gas," he remarked.

Clinic Systems

The Carle Clinic is the largest group medical clinic in Illinois and is associated with the Carle Foundation Hospital.

On-line services handled by the IBM system include patient scheduling and identification, a record locator and admissions systems, two inventory systems and various business functions.

Patients can be scheduled into the clinic over a three- to four-month period with the system providing information on the day and time the patient will arrive, the reason for the visit and the name of the doctor he will see.

Patient identity information is available through either alphabetic or numeric search procedures. The medical record locator system includes such information as whether the patient's record is in the doctor's office, the emergency room or in inactive storage.

The admissions system stores preadmission data so nursing personnel can assign beds, move the information to admissions when the patient comes into the hospital and make any corrections as the patient is moved from bed to bed or discharged.

The mainframe system is also used for daily updates of transactions in all accounts and for tracking of hospital inventory.

The In-7125 memory system runs seven days a week, 24 hours a day and has been up "99.999% of the time," according to Beranek.

The only problem the clinic encountered with the add-on concerned a loose power wire in the unit, he said.

"The downtime with that one failure was almost nothing because I just happened to be fortunate enought to jiggle the wire and it came back up," he recalled. "When the engineers came in on the call, they just tightened the thing so we weren't down more than an hour and a half."

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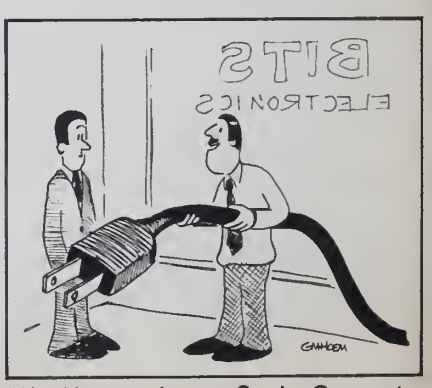

'We Have a Large-Scale Computer as Well...Let Me Demonstrate...'

At Top, Bottom of Line

BC/7 Gets Multiprogramming, Diskette

By Esther Surden
CW Staff

BLUE BELL, Pa. — Univac has unwrapped two additions to its BC/7 product line, rounding out the company's small business systems offerings with a diskette-based system on the low end and a multiprogramming unit on the high end.

With the announcement of these machines, Univac split its BC/7 offerings into three series. The original model, introduced last year, becomes the 750, the first member of the 700 series.

The latest offerings are the 611, which inaugurates the 600 series, and the initiators of the 800 series, the 860, 865 and 870, which differ from each other only in disk capacity.

The BC/7-611 was designed for the very small first-time user who has been using an accounting machine or a service bureau. It is a diskette-based system that uses Shugart Associates double-sided, double-density floppy disk drives. Up to 6M bytes of diskette can be put on the system.

Main storage for the 611 ranges from 48K bytes to 64K bytes; up to two CRT workstations can be accommodated. Each CRT can have its own printer.

A 200 char./sec unidirectional, 200 char./sec bidirectional or 125 line/min system printer is optional, the company noted.

Greater Sophistication

The 800 series, a more sophisticated branch of the BC/7-800 family, is said to give users anticipating "near-term expansion" a system into which they can grow.

The BC/7-800 comes wiht 128K bytes of memory. Its disk storage capacity can be increased from 10M to 40M bytes in 10M-byte increments.

Users can attach up to six CRTs to the system and each CRT can be accompanied by its own printer. Additionally, up to two system printers with speeds from 200 char./sec to 600 line/min can be accommodated on the 800 series, Univac said.

The BC/7-800 runs programs in two 48K-byte partitions. A roll-out/roll-in feature allows programs of higher priority to be executed first, a spokesman explained.

In cases where two programs of different priority are running concurrently and program roll-out is invoked, the operating system selects the lower priority item for roll-out.

If both programs are low priority, the operating system determines roll-out on criteria including the status of the program and the number of I/O requests, the firm said. Users assign their own priority to programs.

Spooling can take place at the same time programs run, according to Univac. The spooling facility supports a maximum of six open print files, two for each of the active partitions plus two for the roll-out partitions.

All spooled files are written to a dedicated on-line disk file, the firm explained, and users can alter the spool queue and direct the operations of the output writer with a utility program.

A file-sharing/record-lock feature included with the 800 allows users to safely update programs, the firm noted.

Univac said that all programs that can be run on the 600 and 700 series are object

(Continued on Page 48)

Some Users Retiring IBM 3/10 As Others Keep Going Strong

By Esther Surden
CW Staff

Users of the original IBM System/3, the Model 10, may be retiring the workhorse system, according to an unscientific sampling of users contacted by *Computerworld*.

Of the 10 users contacted, four are still using the old system to process their applications, but one is considering an upgrade.

Most of the users contacted have, however, stayed with IBM and are still using IBM 3 systems. Two switched to other vendors' systems, two use the Model 12 and two have upgraded to the Model 15.

Of those who have upgraded, growth of their business seemed to be the major factor in the move.

A manufacturer of industrial equipment, Alten Foundry and Machine Works, Inc. of Lancaster, Ohio, is using its leased 3/10 for machine performance analysis, foundry performance analysis, processing of the incentive system, payroll and scheduling.

According to Harry Elliott, treasurer, the Model 10 was adequate for the firm's needs at the time of its installation in July 1972, but growth has spurred the company to look at other systems.

Presently considering the IBM System/34, which Elliott said it "needed yesterday," the firm feels there would be no advantage in buying its Model 10.

No Need to Switch

Another user, Howard Thomas, DP manager for Cannon Craft in Sulpher Springs, Texas, uses his 3/10 for financial applications and sales analysis. Cannon Craft, a manufacturer of louvered shutters and panels, purchased its system.

Although IBM has approached Thomas about the System/34, he likes the system the firm now has and said he has no desire to switch.

Another dedicated Model 10 user, Charles Myers, DP manager for Hedrick Gravel and Sand in Salisbury, N.C., purchased his System/3 in June 1976 because his firm had

(Continued on Page 52)

Switch From Batch Processing Supplies Savings to Distributor

By Ann Dooley
CW Staff

BRIDGEPORT, Conn. — Willis Distributors, Inc. switched from a batch processing service bureau to an on-line minicomputer system in order to provide more efficient customer service at a lower cost.

The move to the minicomputer took place because Willis needed a program the service organization couldn't provide, according to Ruth Paules, the firm's president. "I couldn't get out the reports I needed," she said.

In addition, the service costs kept increasing to the point where it was no longer economical, she recalled.

The distributor of pet supplies looked at offerings from several companies, such as IBM, Basic/Four Corp., Applied Data and Wang Laboratories, but "you get more confused as you look at all of them," Paules commented.

Willis had originally automated in 1961 with an IBM 403 and Paules leaned toward IBM because of its familiarity and service record. But the company accountant said the System/32 couldn't handle the work and the System/34 wouldn't be out soon enough to offset the increased costs of the service company.

So Willis went with Telecomp, Inc. of Milford, Conn., which promised to install a turnkey wholesale distribution system within three months and offered a good price as well, Paules said.

(Continued on Page 48)

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Pharmacy Cuts Losses via Time-Sharing Mini

By Ann Dooley
CW Staff

CHICAGO — Time-sharing on an off-site minicomputer is improving patient care, cutting expenses and reducing drug loss for Mount Sinai Hospital Medical Center here, according to Ronald Betz, director of pharmacy services.

Pharmacy staff enter all medication orders on CRTs; the patient profile, which includes a history of all active and discontinued medications, is displayed on the screen.

From this list, the pharmacist can see whether the newly prescribed drug duplicates a previously prescribed drug or conflicts with other medication. If such a relationship occurs, the pharmacist consults with the doctor, who then makes a final decision.

The system also displays the patient's diet so the pharmacist can determine if the medicine will conflict with food intake. A patient's allergies are also displayed and checked for possible conflict.

In addition, the patient's diagnosis is shown so the pharmacist can check whether the medication and the diagnosis correspond. If the medicine doesn't seem suitable, the pharmacist checks with the doctor.

Total Control

Since the system works in real-time, the pharmacy can maintain the most current prescription information for each patient, keeping control over drug processing at the hospital, according to Betz.

The system is also programmed with the formulas for intravenous fluids. Only the physical preparation of the fluid is left uncompleted by the computer.

Once order entry is completed, the system automatically generates complete medication labels and prices. In addition, the system prints another label the day before a refill is needed and automatically bills the patient for the continuing medication.

The system provides data security through a user-defined password protection system. Each pharmacist must enter an identifying code before an order can be completed so an audit can be performed to check on drug dispensing.

Daily and monthly control reports were instituted on the system to list drug replacement orders suspected of being caused by unexplained loss. If such a loss occurs, the head nurse of each ward receives a document listing drug quantity and dollar amounts.

Because of the system, drug loss has been cut in half; this has brought annual savings of $30,000, according to Betz.

The system also provides physicians with daily medication schedules for review and updating. In addition, all nurse stations are given daily schedules for dispensing medication to patients. As drugs are deleted from a patient's schedule, the system provides an update.

Aid to Dieticians

Hospital dieticians are provided with CRT access to the system to update dietary information and to inquire about diet restrictions based on current drug therapy.

In addition, the clinical laboratory can access the system via CRT to determine drug-to-lab test interactions.

The system provides detail and summary billing of medication charges by patient. By eliminating manual pricing errors and making sure the correct patient is billed for the correct amount of medicine, losses are being greatly reduced and revenues have increased, Betz said.

The pharmacy is planning to install an outpatient prescription program, provision for unit dose processing, interdepartmental billing and inventory control soon, he noted.

The Mount Sinai pharmacy has two CRTs and two printers and time-shares a Datapoint Corp. 5500 or 6600 at Distributed Information Systems Corp. (Disco) headquarters here. The system is based on the Discomed Pharmacy II program.

The pharmacy operation is scheduled to convert to a stand-alone operation within a year.

The system, which has undergone continuous expansions, has been in operation for nearly six years. "We first went to IBM and Honeywell, but they both said they didn't have time to develop a pharmacy system, so we went to Disco and are extremely happy," Betz said.

Mount Sinai is a teaching hospital with 440 beds and 10,000 active outpatient pharmacy records per year.

Tab Has 5100 Cartridge

PALO ALTO, Calif. — Tab Products Co. has a .25-in. magnetic tape cartridge designed for small systems applications.

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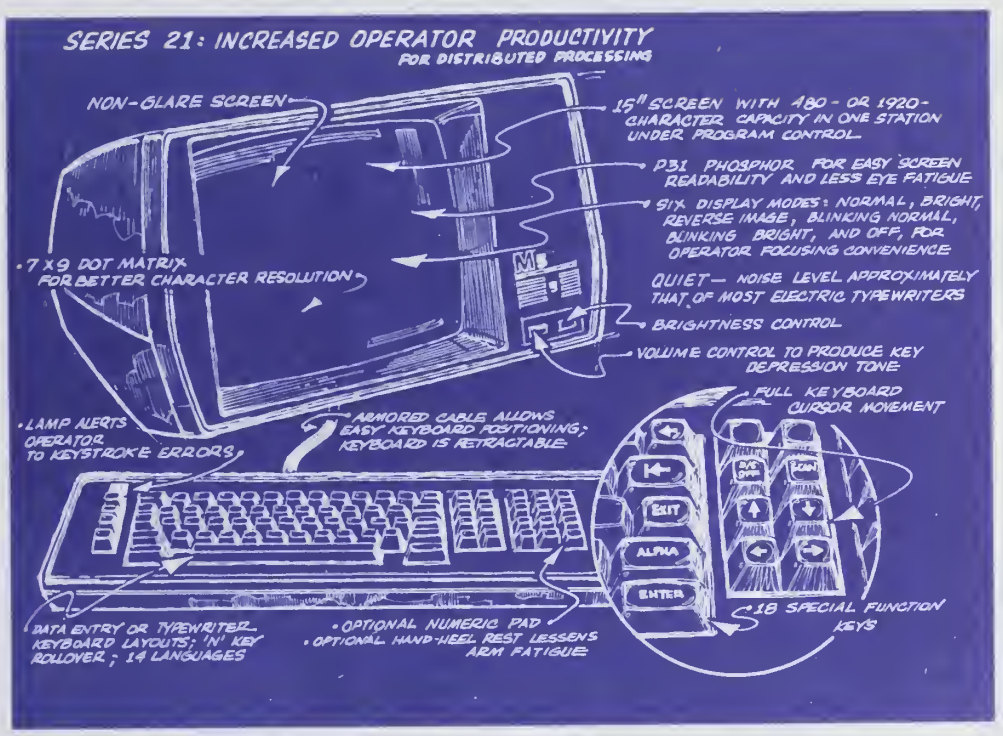

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Move In-House Supplies Savings to Distributor

(Continued from Page 45)

She also liked the fact that Telecomp is a young company; since Willis would be its first installation of this kind, she felt they were eager to do it right.

In addition, Paules was familiar with the work of one member of the staff and trusted his expertise.

"They've provided good service and are capable people," she said. "There were a few minor problems, but all in all they've done an excellent job. Now I have more control, better figures and can save on help."

Payroll Still Outside

The system performs general ledger, purchasing, order entry, sales, accounts receivable , inventory and sales analysis. Payroll is still done outside, however, since it's cheaper, Paules noted.

The order entry process begins when a salesman takes an order from a customer and on a portable terminal keys in information including the order number, the quantity and any special discounts. At the end of the day, the orders are transmitted over the phone via dial-up lines for a complete listing.

The order list can be updated and transmission errors corrected before the data is keypunched into the order file. Orders are sent up to the inventory department where the supplies are packed and picked up.

A truck list is processed which includes the same information taken at the point of order entry as well as any changes or out-of-stock listings. The trucks are loaded with the merchandise and the invoice is sent to the customer with the merchandise.

Orders taken during a day are loaded onto the trucks that same evening and the invoices are prepared and ready to be delivered along with the order the next morning, according to Paules.

System Reports

The system updates changes by giving the average retail price and the effective date to the salesmen. It also provides a daily out-of-stock report which creates a more accurate inventory, Paules said.

In addition, the system can generate a report for customers that shows the kinds and quantities of merchandise they have ordered for the year. The system also performs a daily run off of invoices and a daily profit list.

No training was required for the user staff and the installation of the system took place in one day, according to Paules.

The system hardware consists of 64K Interdata, Inc. 6/16 CPU, two 25M-byte disk drives, four CRTs, six portable Azurdata, Inc. terminals used by the salesmen for direct input and a 300 line/min printer.

With the programming, the system cost the firm approximately $87,000.

Univac Expands BC/7 Offerings

(Continued from Page 45)

code-compatible with the 800 series but since commands have been added to the system control language, it may be necessary for users to alter the jobstreams, recompile programs or slightly modify programs.

To upgrade from the 611 to the 750, users need only trade in their diskettes for disks. The 700 series is field-upgradable to the 800, the firm said, although that upgrade is a bit more extensive, requiring a different backplane, a different memory and more I/O slots.

With the introduction of the two series, Univac effectively realigned the pricing structure of the 700 systems. In effect, the 750 has been reduced by $700 while gaining some capabilities, such as a menu-driven inquiry feature that allows users to find out such information as the status of a part.

A BC/7-611 with 48K bytes of memory, one CRT with a standard keyboard, two 1M-byte diskette drives with power supply and a 200 char./sec unidirectional printer costs $21,795.

The BC/7-750 with 48K of memory, one workstation, 5M bytes of disk and a 200 char/sec unidirectional printer costs $31,200. The 860 with 128K bytes of memory, one workstation, 10M bytes of disk and a 200 char./sec printer costs $35,475.

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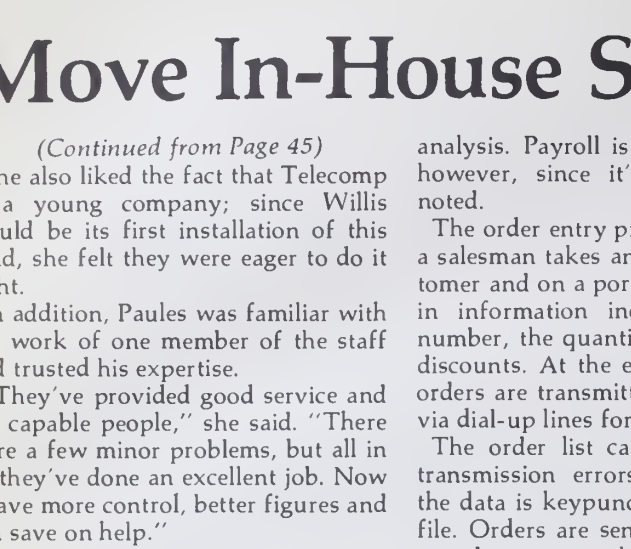

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With Small System

Manufacturer Heightens Accounting Accuracy

By Esther Surden
CW Staff

CHICAGO — A small business system combined with the vendor's packaged software has increased the accuracy of general accounting applications, a maker of industrial tempered products and glass here found.

Until last May, Chicago Dial Co. had used an "old-fashioned bookkeeping machine" and, except for the help of an IBM 5100 desktop system used for certain estimating applications, had no computer power at all, according to Douglas Felten, general manager.

Felten was able to determine what his business needed from prior experience. "I'd learned some hard lessons about upward capability and upward mobility. My knowledge of the various manufacturers' products led me pretty much directly to the Burroughs B80," he said, adding "we did do some peripheral looking" to make sure there wasn't anything the company had missed.

Chicago Dial is running payroll, general ledger and accounts receivable on the system. "We have scheduled payables, invoicing system and inventory control to run within the next year," Felten noted. The company also expects to develop its own order entry control system.

Minor Modifications

Some of the packages acquired from Burroughs have needed modifications, but they have been "relatively" minor. "We were the test site for the payroll system," he noted, so that system needed a few more modifications than normal.

The receivables system took only two weeks to put in and there "were substantially zero modifications" in that case, he said. Most of that time was spent entering the initial data, such as customer name and number and address, for the approximately 1,000 customers.

The company has performed a number of modifications on the general ledger package and "we will do more," Felten noted, mainly because of their reporting system.

The accounting part of the general ledger system needed none, but the reporting part did because 'of the specified format of its reports.

Order Detailed

Chicago Dial plans to write the order entry/production control system on the small business system. "We will be collecting the in-bound data on orders," such as what kind of an order it is, where it is going to be processed and what raw materials are necessary to complete the order, Felten said.

The application will also keep track of the order while it is in the production system. It will answer questions such as how many pieces the company lost and how much the product cost to produce.

In addition, the system will work with the sales invoicing and the accounts receivable system. A sale will be recorded by category or territory. Eventually the company hopes to produce a report on profitability by customer.

Chicago Dial employs a programmer to run its small business system. Felten and his controller have extensive computer-related experience as well.

Help from Home

"We are also getting some help from our home office," he said, explaining that Chicago Dial is a subsidiary of a larger company.

"I'm sure it's possible to run a 'stock' system without an in-house programmer, although somebody would have to make a few modifications to every system," he continued. Most users could turn to the vendor to make those modifications. "Rarely does a packaged system fit your needs exclusively," he added.

The former bookkeeping machine operator is now the B80 operator.

The company expects to soon add one CRT terminal to the system that will allow a billing person to input invoice information. Later in the year an inquiry terminal will be added to be used by the customer service people and in the inventory control area.

Savings Predicted

The company has not identified any immediate cost savings from installing the small system, but Felten expects savings in the long run. "My experience is that computers rarely save you any money in the short term; the plan that I had for the computer is to save money in the long term."

He pointed out the firm had to hire a programmer and it is not yet performing any applications on the B80 that it did not do in the past, and "with the same number of people."

"However, the volume we are processing right now is higher than before, and going into this next year we will be processing substantially higher volume. "I'm sure at that point we will start to realize some savings," he noted.

The company also feels the better reporting it will get from its small business system will help management make better decisions, thereby helping the company increase revenues.

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Some IBM 3/10s Retired, Some Going Strong

(Continued from Page 45)

accrued enough credits to make its purchase worthwhile. In addition, IBM had reduced prices by 10% at that time.

Myers has also looked at the System/34. "It looks like a super system. If we were going to move up from a 10, we might consider the 34."

Since his firm is not using to its capacity the 3/10 it has now, Charles L. Golden, assistant controller of Diamond Glass Co. in Royersford, Penn., feels it will be adequate in the foreseeable future.

The firm, which makes glass containers for the cosmetic and beverage industry, began its DP history with a service bureau, moved to a 360/20 and then upgraded to the 3/10.

The company leases its system and has been asked to buy it "countless times," Golden reported, but it is "not interested."

Upgrades to Model 12

In Menasha, Wis., Wisconsin Tissue Mills, Inc. upgraded from its original 3/10 to a Model 12 for more storage capacity, according to Kalvin Barrow, DP manager. The maker of paper products does order entry, billing, inventory control, payroll, sales analysis and efficiency reporting on its system.

The 3/12 is leased and will continue to be because its user feels it might outgrow it in the next five years. Although IBM has not yet approached the company about the System/34, Barrow feels the system — with some major enhancements — could be an upgrade alternative.

"As it is right now, the system is not large enough," he explained.

Hillcrest Baptist Hospital of Waco, Texas, is also a 3/12 user who upgraded from the 3/10 because it needed more disk capability, according to Ed Moore, DP manager. The hospital runs all of its financial applications, including patient billing, on the system.

The hospital leases its system, installed last year, and will continue to lease it because "we will be growing," Moore predicted.

A former 3/10 user who upgraded to the Model 15, Santee Portland Cement Corp. in Holly Hill, S.C., runs all its accounting and inventory applications for five divisions on its system. Santee's DP history dates back to the installation of a 360/20, which was upgraded to the 3/10.

Although the firm has been approached about the System/34, that system's storage capacity is not large enough for its needs, C.D. Townsley, DP manager, noted.

A company that has moved through the 3/10 to the 3/12 and finally to the 3/15, Adirondack Chair Co. Inc., in New York City, grew at a pace that the early systems couldn't handle. "We also went into on-line applications," Herb Stanger, DP manager, recalled.

The company, which sells institutional furniture through catalogs runs order writing, billing, receivables and payables on its rented system.

Although it has been asked to buy the system, the firm feels "it doesn't really pay unless you plan to hold on to the system for five years," Stanger said.

One of the users who switched systems, Ranzy Gammal, DP/systems manager for Henry Walke Co., Inc. in Norfolk Va., now uses a Hewlett-Packard Co. minicomputer. "We needed to upgrade," Gammal said, and the HP system looked "much more advantageous."

The two influencing factors were cost and machine performance. HP also had "very strong software," he noted.

Another user who switched was a 3/-10 user which moved to a Data General Corp. Nova 3D because it needed to go to on-line order entry. The user, which did not want to be identified, leased its system from IBM.

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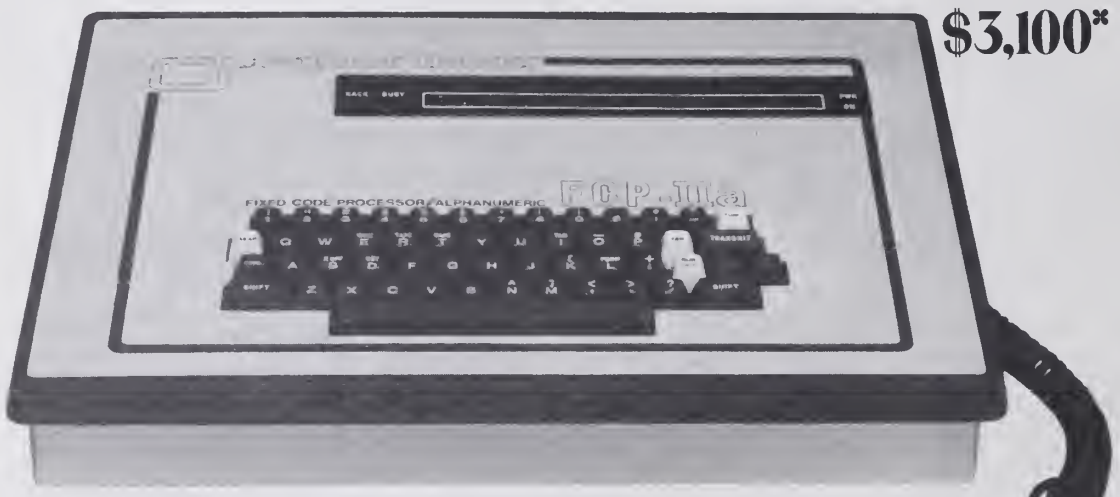

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Disk Controller Gives DG Users Alternatives

PALO ALTO, Calif. — Minicomputer Technology has a minidisk controller that reportedly allows Data General minicomputers to accommodate drives from Control Data Corp., Ampex Corp., California Computer Products, Inc., Memorex Corp. and Microdata Corp.

The single-card Model SMC902 offers up to 600M bytes of on-line storage and occupies one CPU slot, according to a spokesman.

Software support for the SMC902 includes RDOS, Iris and Blis/Cobol compatible drivers and a stand-alone diagnostic/formatter program, he said, adding standard features include full sector buffering and direct memory access (DMA).

The unit costs $2,400, including cabling to the first drive and a one-year warranty, Minicomputer Technology said from 2470 Embarcadero Way, Palo Alto, Calif. 94303.

Printer Fits Series/1

STAMFORD, Conn. — Digital Associates Corp. (DAC) has a heavy-duty, chaintrain printer plug-compatible with the IBM Series/1 minicomputer.

The company is offering print speeds of 300-, 600- and 1,000 line/min on the printer, which will be available in the second quarter.

The 300 line/min unit will cost $10,965, the 600 line/min printer $13,366 and the 1,000 line/min unit $18,900, DAC said from 1039 E. Main St., Stamford, Conn. 06902.

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PERKIN-ELMER
Data Systems

Dual Systems Meet Newspaper's Backup Need

By Esther Surden
CW Staff

HUDSON, N.Y. — A production/editorial/classified processing system that uses two small processors as its base has helped the *Hudson Register-Star* here cut costs and improve production, according to Paul J. Zindell, production manager.

The newspaper spent less than $60,000 for the system and expects to recoup its costs in three years, he added.

Based on Harris Corp. Computype equipment, the system was chosen on the criteria of modularity, simplicity of use and reliability, he said. Modularity was important because the hardware needed to be swapped out for repairs; simplicity was a must because nontechnical people were going to operate it and reliability was essential because newspapers have deadlines to meet.

The paper kept its business operations and newspaper production separate so that if one part went down, the other would not necessarily be affected.

The system has allowed the *Register-Star* to cut by two and a half the number of positions needed to put out the paper. Composing time per page was cut from 2.8 hours to under two, Zindell said.

Each CPU stores local copy, display ads and wire copy on its floppy disk. In-house copy is produced and edited online, filed in the system and output on paper tape. "Canned" copy — press releases, for example — is set by a production typist who inputs it.

When reporters write a story, it is output to a hard-copy printer for backup. Thus, if the system goes down before the story is edited, the article isn't completely lost.

The *Register-Star* expects to put two Compu-Edit CRT terminals in its two bureaus next year, connected by dial-up lines to the CPUs in Hudson.

The display and classified advertising sections are always an important part of a newspaper's business and at the *Register-Star* ads are set via a CRT by a production typist; the classifieds are categorized by the system. In the future the newspaper expects to put a CRT in the classified advertising department so an operator can input an ad while the customer is still on the phone.

Double Backup

"A unique feature of the system is the double backup to allow continued processing should one or even both of the Microstar CPUs fail. If one goes down, the other can handle other terminals by simple interfacing with a four-way switch box," Zindell noted.

"Should both processors fail, all terminals would output directly to the punches via two four-way boxes," he added.

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- **Michael Jackson,** Michael Jackson Systems Ltd.
- **William Oncken,** William Oncken Corporation
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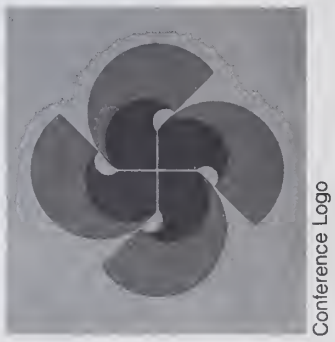

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Write or call Ms. Sharon Trube, DELTAK, inc., 9950 West Lawrence Avenue, Suite 50, Schiller Park, Illinois 60176; phone: 312-671-5300.

DELTAK

Turnkey Set On Series/1

ENGLEWOOD, Colo. — A turnkey business system based on the IBM Series/1 minicomputer is available from Gemini Information Systems, Inc.

The system, with 65K bytes of memory, console CRT, 9M bytes of both floppy and hard disk, an additional CRT and a 200 line/min printer, contains a software combination of IBM and Gemini packages.

Included with the system is the Real-Time Programming System, Fortran IV and PL/I from IBM and Geminis' Data Demon, a data base management and query system and an accounting system.

The hardware/software system costs $48,500 from Gemini at 5650 S. Syracuse Circle, Englewood, Colo. 80110.

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Heath H8 Users Get Floppy Disk, Upgrade to Z-80

CARSON, Calif. — Users of Heath Co.'s H8 microcomputer can both add a floppy disk and upgrade their processor to a Z-80 with a system released here by the Info 2000 Corp.

The disk system includes Persci, Inc. dual diskette drives, a power supply, an intelligent controller and a disk monitor.

The unit has 7K of erasable programmable read-only memory (Eprom) and 1K of scratch-pad random-access memory for the disk monitor, according to a spokesman.

With the addition of an adapter board, the H8 microcomputer can run in either one of two switch-selectable modes. One mode enables continued use of the H8 Eprom monitor and Heath Benton Harbor software; in this mode, the computer performs at Z-80 speed and uses the extended instruction set of that microprocessing unit, the spokesman noted.

The second mode supports the Info 2000 disk monitor and related software, allowing use of its TDL and CP/M disk systems, he said.

Price of the disk system is $2,750 with a 5% discount available when payment accompanies the order. Info 2000 Corp. is located at 20630 S. Leapwood Ave., Carson, Calif. 90746.

Hobby Becomes a Business

Micro Monitoring Home Water Use

By Tim Scannell
CW Staff

PIEDMONT, Calif. — When William Oliver decided to usefully apply his microcomputer system in this small residential town, the last thing he wanted to do was wait until a rainy day.

Together with his daughter and a few neighborhood teenagers, the self-employed computer consultant operates a weekly water-usage reporting service that provides individual statistics to more than 100 homes in what was, until very recently, a water-short and rationed California.

Using a system based on an Imsai microcomputer, Oliver's business evolved from a program he had written for himself. "Northern California thought it was short of rain up until the last couple of weeks. Late last spring my daughter came to me and told me she needed a job for the summer.

"At that time, I had written a small program to keep track of my own water use and that of my mother's. So I thought to myself, maybe people would like to know how much water they use on a weekly basis," he recalled.

The district water company for Piedmont provides the same service, but on a bimonthly and somewhat limited basis, he said..

After deciding his idea would be accepted, Oliver took steps to introduce its existence: "I had teenagers pass out some 8-1/2 by 11 printed things to the surrounding homes, telling them what I was going to do.

"Since then, on a weekly basis, we've been reading their meters and plugging the stuff into a program and coming out with beautiful little computer reports that tell them all their averages over a period of time," he said.

Even though Oliver's business is competition of a sort, the local water company doesn't seem to mind. "The utility district that is in charge of [monitoring] the water responded with no answer when I asked whether it would be all right if I did it," he said.

The system used by Oliver, assembled from various kits, is composed of an Imsai 8080 with 64K of memory; two floppy disk drives, each with a capacity of 250,000 characters; a Lear Siegler, Inc. ADM-3A terminal; a Qume printer; and four serial ports. He uses the system in his business for approximately four hours each week, he noted.

Switching Help

The Imsai has also been used as an intelligent terminal between two time-sharing computer systems, Oliver stated. While working for a former employer, he had a problem switching from one computer to the other.

"Because of the nature of the two different computers and the languages involved, nobody could figure how to transfer information. I taught my Imsai to talk to both of them through the telephone lines and I did the translation. It was a great tool to have around," he said.

Oliver, having entered DP through the software field, had no previous electronic experience other than that acquired from assembling various Heath Co. kits.

"I bought my computer in kit form for two reasons: number one, saving money; and two, I wanted to deal with a computer on a one-to-one basis," he said.

Aside from having a few problems with defective boards and short circuiting, Oliver is satisfied with his selection of Imsai products. "Once you get the stuff up and running, it stays up and running," he said.

Terminal Comes on S-100 Board

PALO ALTO, Calif. — A terminal contained on an S-100 bus board that reportedly requires only the addition of a microcomputer, CRT monitor and keyboard for operation is available from Dynabyte, Inc.

The Naked Terminal displays 24 lines with 80 char./line, prints both upper and lower case and requires no support software, a spokesman said. It features complete cursor control, direct cursor addressing and switch-selectable half- and full-duplex and block modes.

In the block mode, editing is allowed before transmission, the firm noted.

Status bits of the unit may be positive true or negative true and can reportedly be assigned to any bit of the status word. The status port can be addressed anywhere, the spokesman said.

The unit includes an underline cursor that can be switch-selected as blinking or nonblinking and a selectable black-on-white or white-on-black display.

Assembled, socketed and tested, the Naked Terminal is priced at $350 with quantity discounts available, Dynabyte said from 4020 Fabian Way, Palo Alto, Calif. 94303.

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H **HERTZ** — A unit of frequency equal to one cycle per second.

HEXADECIMAL NUMBER SYSTEM — The number system with the base of 16 (contrasted with decimal, which has a base of 10).

I **ICAND REGISTER** — The register which in multiplication holds the multiplicand.

ICE — ICE is an In-Circuit Emulator which is plugged directly into the user's systems in a real-time environment. ICE is used to control, interrogate, revise and completely debug a user's system in its own environment. For Intel Corp. 8080-based products, ICE-80 is provided, and ICE-30 is used to develop products with the bipolar micocomputer set.

IEEE — Institute of Electrical and Electronics Engineers.

IER REGISTER — The register that contains the multiplier during a multiplication operation.

IGNORE — 1. A typewriter character indicating that no action whatsoever be taken, i.e., in Teletype or Flexowriter code, a character code consisting of holes punched in every hole position is an ignore character; this convention makes possible erasing any previously punched character. 2. An instruction requiring nonperformance of what normally might be executed, i.e., not to be executed. This instruction should not be confused with a no op or do nothing instruction, since these generally refer to an instruction outside themselves.

INITIALIZE — 1. Refers to a program or hardware circuit which will return a program, a system or a hardware device to an original state. 2. To set an instruction, counter, switch or address to a specified starting condition at a specified time in a program.

IN-LINE — A method of processing in which individual input transactions are completely processed and all pertinent records are updated without previously having been grouped.

INPUT — 1. An adjective referring to a device or collective set of devices used for bringing data into another device. 2. A channel for impressing a state on a device or logic element. 3. Pertaining to a device process or channel involved in an input process or to the data or states involved in an input process. In the English language, the adjective "input" may be used in place of "input data," "input signal," "input terminal," etc., when such usage is clear in a given context. 4. Pertaining to a device, process or channel involved in the insertion of data or states, or to the data or states involved.

LEARNER'S LEXICON

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TAXES SOFTWARE: Computes Form 1040 & 5 schedules. See if you can itemize, income average, etc. BASIC; 10 K min. Tarbell, Sol, Northstar, call about others. Cassette, $20, Disk $26. DICOMP, 2053 Manzanita Dr., Oakland, Ca. 94611. (415) 434-4767.

OPPORTUNITY FOR BUSINESS MICROCOMPUTER DEALERSHIPS. California Microcomputer Company's (CMC) previous ads in Computerworld has rsulted in several established dealerships. If you are interested in a CMC Dealership for a small business microcomputer system that includes CPA approved busienss software, call or write us. 1 year free software releases to customers. Complete leasing and maintenance plan available to dealers. California Microcomputer Company, P.O. Box 3199, Chico, CA 95927 (916) 891-1420.

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Microsoft ("Altair") BASIC for 8080/Z80/6502 and FORTRAN IV for 8080/Z80 now available to OEMs, end users. 8080/Z80 BASIC has random sequential files; double precision; IF ... THEN ... ELSE and more. FORTRAN produces optimized relocatable code, meets ANSI66 except complex.CP/M and ISI-II BASIC or FORTRAN, off the shelf or custom versions. Microsoft, 300 San Mateo NE, Suite 819, Albuquerque, NM 87108 (505) 262-1486.

HOW TO ADVERTISE: This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment, software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

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BOX NUMBERS: Available at $5.00 per insertion. Send replies to box numbers to: Box (XXXX), Microcomputing Exchange, Computerworld, 797 Washington Street, Newton, Mass. 02160.

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ATLANTA Southeastern Computer Expo	April 18, 19, 20 World Congress Center
ST. LOUIS Gateway Computer Expo	April 25, 26, 27 Gateway Convention Center
CHICAGO Midwestern Computer Expo	May 2, 3, 4 McCormick Place
NEW YORK Mid-Atlantic Computer Expo	May 9, 10, 11 New York Coliseum
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Pro-Log Uses 6800 As Logic System Basis

MONTEREY, Calif. — A single-card programmable-logic system based on the 6800 microprocessor and suited for small-scale DP applications has been introduced by Pro-Log Corp.

The PLS-868 includes 1K of IBM 2114-type random-access memory (RAM) and sockets for up to 8K of IBM 2716-type erasable programmable read-only memory (Eprom), the firm said.

The user can jumper-set either RAM or I/O into memory base Page 00 for use with the 6800's memory direct instructions, a spokesman added.

The logic card includes a crystal clock, two interrupt inputs, power-on and external reset, three (expandable to eight) 8-bit output ports and two (expandable to eight) 8-bit input ports, he said. The system operates from a 5 Vdc power supply and is TTL-compatible.

The unit is priced at $295 with quantity discounts available, Pro-Log said from 2411 Garden Road, Monterey, Calif. 93940.

Board Links S-100 Devices

SYLMAR, Calif. — Vector Electronics Co., Inc. has a motherboard designed to allow the interconnection of microprocessors, memories and interface boards using the S-100 bus.

The Model 8803 reportedly eliminates the need for backplane wiring. It has prewired circuits for either active or passive bus-line termination, the firm said.

The unit has etched traces for all 96 bus lines as well as heavy buses for ground, 5V and 12V. Pre-established points for power supply sense lines permit remote monitoring voltages.

The 8803 has positions for 11 R681-2 or equivalent card-edge connectors with 100 contacts, .125-in. centers and .250-in. row spacing, a spokesman said.

Price of the motherboard, including a component lay-out and calibration procedures, is $29.95 from Vector at 12460 Gladstone Ave., Sylmar, Calif. 91342.

Floppy Disk Controller Fits 8010

WALTHAM, Mass. — GSI Systems Co. has introduced a single-board floppy disk controller it said is 8010 bus-compatible and can control up to four disk drives.

The Model 10043 is a microprocessor-based disk control card that has an IBM-compatible format with 3,328 bytes of data per track and a total of 77 tracks, a spokesman said.

The unit also features a non-IBM-compatible option that formats each track with two sectors containing a total of 4K bytes, he stated.

Interrupt Option

The controller independently executes commands and reports completion of a command to the host, the firm said. An interrupt option allows the host to be interrupted when the disk controller has completed a task.

The 10043 has a formatter option that enables the user to format raw diskettes; it is equipped to perform self-tests and status and error reporting, the firm stated.

The price of the floppy disk controller is $495. GSI Systems is at 223 Crescent St., Waltham, Mass. 02154.

Minifloppy Unit Stores 70K

SANTA ANA, Calif. — A minifloppy disk system with a storage capacity of 70K characters that is RS-232 compatible has been announced by Western Telematic, Inc.

The Datamate features selective transmission rates up to 9,600 bit/sec and operates under both manual and remote control, a spokesman said.

Edit Features

Editing capabilities include backspace erase, insert, delete, skip, go-to-link and auto line feed functions.

The price of the minifloppy disk system is $1,750 from the firm at 2435 S. Anne St., Santa Ana, Calif. 92704.

Micral C Has 32K RAM

MINNEAPOLIS — A microprocessing system with 32K of random-access memory (RAM) and a 10M-byte cartridge disk unit has been introduced by R2E of America.

The Micral C system includes an 8-bit microprocessing unit (MPU), a 1,920-character upper/lower case CRT, a keyboard with numeric pad and dual double-density minifloppy drives providing 320K bytes of storage, a spokesman said.

The cartridge disk drive stores data onto a removeable or fixed surface and has a transfer rate of 92K byte/sec, he added.

100W Power

The disk drive operates with 100W of power and its head positioning is controlled by a linear motor/voice-coil positioner with position feedback from the media, the firm added.

Software includes an assembler; BAL with a sequential and random-access file management system; and an 8080 Ansi Fortran IV compiler, the firm said.

The system costs $15,950 from the firm at 3406 University Ave. S.E., Minneapolis, Minn. 55414.

Micral C

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GSA's 1977 Inventory Shows

IBM's Share of Federal Pie Shrinking

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — Federal users helped themselves to bigger portions of Digital Equipment Corp., Hewlett-Packard Co. and Data General Corp. computer and communications equipment during fiscal year 1977, according to the annual inventory of federal DP installations conducted by the General Services Administration (GSA).

In beefing up their presence at government installations, DEC — which showed a gain of 39% over the dollar value it had installed in fiscal 1976, HP — which grew 35%, and DG — which jumped 53%, ate away at IBM's leadership as a government DP supplier.

IBM continued to lead in the value of its installed federal DP base, but its percentage of the total dropped from 32.6% at the end of 1976 to 30.5% by October 1977.

Mainframers, too, helped reduce IBM's share of the federal market. Honeywell Information Systems, Inc. and Burroughs Corp. fattened their installed bases 24% and 16%, respectively, and did so on equipment values far exceeding those of the small computer companies.

IBM continued to consume the biggest piece of the pie in net DP shipments, which grew to $1.46 billion from $1.44 billion the year before, a gain of 1%.

The second and third slices of that pie were considerably smaller and went to Control Data Corp., with $735 million in net shipments, and Univac, with $635 million.

DEC No. 1 in Numbers

DEC far and away netted the largest number of CPUs installed — a total of 2,593 by year-end 1977. Because most of these processors are small, however, DEC only achieved sixth place in dollar value of the federal base with $171 million.

Univac installed 1,617 CPUs in fiscal 1977 and IBM had 1,225 CPUs in place at year-end.

The GSA inventory showed federal computer installations took a bigger bite out of the total government budget in 1977; the total value of the equipment installed by October was $4.77 billion, a gain of 8% over the $4.41 billion owned, leased or rented by the government in 1976.

GSA includes in its inventory commercial computer gear installed in all federal agencies. It does not, however, list specialized militarized computer equipment or the commercial installations involved in classified and intelligence operations.

While CDC increased the total dollar value of its installed base by only 1% from $727 million last year, Univac gained 8%, jumping from $583 million in 1976. Its increase was attributable, in part, to its acquisition of Varian Data Machines, which had an installed federal base of $14 million in 1976.

No. 4 in dollar value, HIS achieved a 24% growth in dollar value in fiscal 1977 — to $456 million from $368 million the year before.

The sharpest percentage gains belonged to the smaller companies, however. DEC achieved its 39% increase by boosting its dollar value installed from $123 million to $171 million.

HP won its 35% increase in dollar value installed by jumping to $38 million from $28 million in fiscal 1976, and DG rose 53% to $23 million from $15 million the year before.

DEC's lead in number of processors represented a 23% increase over the 2,095 CPUs it had installed last year.

Univac only had five more processors installed at the end of fiscal 1977 than it did at the close of 1976. Similarly, IBM added 23 CPUs to the 1,202 processors it had in place in fiscal 1976.

HIS, fourth in number of processors as in dollar value installed, increased the number

(Continued on Page 60)

IBM Moves Hurt PCM Finances: Broker

By Molly Upton
CW Staff

SAN FRANCISCO — IBM's actions between 1969 and 1972 caused the investment community to cease extending permanent capital to plug-compatible manufacturers (PCMs), according to Eugene K. Collins, director of research at Evans & Co., a New York brokerage firm.

Collins told the jury in the Memorex Corp. vs. IBM antitrust trial here that the PCMs' inability to raise permanent capital constituted a barrier to entry in the market.

He drew a distinct parallel between the chronology of IBM's actions and the PCMs' inability to raise permanent capital — that which a firm held for over five years.

The IBM moves perceived by investors as boding ill for the PCMs included introduction of the 2319A disk drive for the 370/135 and 145 and the 2319B drive for 360s, and the Fixed-Term and Extended-term plans, he said, as well as the addition of the 3330 drive and the use of integrated file adapter nd integrated storage controllers.

The witness also testified extensively from documents written by members of the financial community, including himself, concerning their skepticism of the PCMs' viability after various IBM announcements. Other documents introduced into evidence showed IBM analysis closely watched the health of firms such as Memorex.

Leasing Environment

The PCMs' requirements for capital constituted a barrier to entry because they could not survive in a lease-based industry without funding, he said. Lease revenues accrued more slowly than revenues from equipment sales and firms had difficulty showing a profit during their early years.

The PCM market was lease-oriented because it, like the rest of the DP industry, grew out of the tabulating machine market for which IBM had constructed a leasing environment, he observed.

Although permanent capital became unavailable for PCMs and others in lease-based DP markets, by contrast, minicomputer firms, which are in a sales market, have been able to raise increasing amounts of capital since 1969, Collins said.

Ten large PCMs obtained capitalization at a relatively good rate from 1966 to 1968 and in 1969 reached $113 million, he said. This grew in 1970 to $128 million and then "fell off sharply," dwindling to the point where virtually none was available in 1974, he said.

IBM announced the 3330 disk drive in June 1970, the 2319A in September and the 2319B in December. The Fixed-Term Plan

(Continued on Page 60)

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IBM Moves Discouraged PCM Backers: Broker

(Continued from Page 59)
was unveiled in May 1971. In the first quarter of 1972, IBM announced the 3705 communications controller and the Extended-Term Plan. The smash announcement, including the integrated storage controller for its 370/158 and 168, came in the second half of 1972.

As an example of the difference in balance sheets displayed by sales- and lease-oriented firms, Collins said a $100 million company with a product cost of $80 million would show a $20 million profit before taxes if it sold its product.

But if that same company leased its product, it would show a loss of $36.9 million, he said. The difference in cash flow — the amount investment bankers consider necessary to keep a firm in business — between the two firms is $87.5 million, he said.

Collins concluded that it is extremely difficult for the investment community to finance a company entering the PCM arena in which it is competing against IBM or any company in a rental base market.

Memorex was attempting to raise $200 million in the early '70s to finance its Independent Leasing Co. (ILC).

IBM Assessment

Looking at IBM's assessment of the industry, documents as early as September 1967 from IBM's T.C. Papes to Frank Cary and John Opel, now chairman and president, respectively, showed that a "predominant lease market places the greatest financial strain on the competing equipment manufacturers."

In the latter part of 1969, IBM's market evaluation department shared the optimistic view of the investment community about PCMs' chances of finding capital. "There will be a rapid buildup of marketing and manufacturing ... As additional capital is required, the money market will smile on them," according to that report.

IBM was concerned about the inroads made by the PCMs, according to a memo from J.E. Bertram to W.C. Hume and John Opel in November 1970. The disk area "has come to be an item of major concern for IBM over the last six months, because of growth and technical competence of our competition."

Bertram suggested addressing the problem by introducing products more frequently, but said the firm would have some problem adjusting to that.

Another document from IBM a month later, written by R.P. Fletcher, indicated the 2319B, announced for use with 360s, should reduce PCM penetration from 60% to 38% and cause PCMs to lower prices in order to compete. Their reduced prices would extend the pay-back period for PCMs, who, as a result, would have more difficulty obtaining financing, he said.

"The cost of money (12%-18%) and the ability to obtain financing can be a problem for the PCM manufacturers," he observed.

The Fletcher memo also observed that over 90% of the PCM base was on lease.

If IBM took no action, a 1970 management committee memo expected PCMs could account for 30% of the leased disk drive base and 16% of the leased drive base by 1976.

Wall Street's Attitude

Wall Street, meanwhile, did not view the PCM arena as an isolated segment of the business, Collins indicated. The exit of RCA, GE, Memorex, Singer and Xerox from the mainframe arena because of the capital requirements "shocked Wall Street and left it with continuing concern regarding risks involved in competing against IBM in any market," he commented.

Lessors, too, had their troubles obtaining capital, in part because of IBM's unbundling and the announcement of the 370 which had a larger purchase-lease ratio than the 360, he said.

Their predicament in turn affected the PCMs because lessors were a large market for the PCM's products.

Investors became increasingly jittery. A memo from D.A. Duncan to William D. Witter, Inc. a New York brokerage firm, in December 1970 after the 2319B announcement, said he could "not recall any such substantial prior price reduction in IBM's history which covered such a broad population base." IBM had announced its price umbrella and had elected to take on the PCMs, he wrote. Because the 2319B announcement also included elimination of extra-use charges, the price reduction was about 25% compared with a 2314, he said.

The 2319 actions "raise a significant investment cloud over the entire independent peripherals industry and this uncertainty makes us extremely cautious until further developments take place," Duncan wrote.

IBM's marketing moves and timing in recent months have come at extremely inopportune times for Memorex, Duncan observed.

A comparison of lease prices showed IBM's 2314 was priced at $2,935 and the PCM's version was $2,610, but the new IBM 2319 was $2,480, Duncan observed.

Eye on Memorex

IBM, too, was watching the effects of its actions, and an IBM advisory financial analyst wrote in April 1971 that Memorex's 2314 business was "marginal, the firm's success with its version of the 3330 is "critical."

Memorex would need volume and its cash needs would peak in 1974 when it would have to refinance its leasing subsidiary, ILC, the memo said.

The price reaction would result in 2314 program losses, which in turn would mean a cash problem for the firm, the IBM memo said. Memorex's alternatives, according to the IBM study, were to reduce production of its 2314, reduce the size of its organization and announce the 3330 early.

In June 1971 a report from Goldman Sachs Co., another investment firm, said the implications of the Fixed-Term Plan and other IBM moves were "more than just another price cut." The PCMs were getting to the point of a slight profit margin and might have to evaluate their spending on such areas as research and development. According to the report, "the high degree of risk imposed by IBM might make financing shipments difficult."

By March 1972, Collins said he and the rest of the investment community were losing interest in the PCMs.

Firms such as Marshall Industries had to leave the business because of lack of capital, as cited by that firm in its 1972 annual report.

IBM's cross-examination of Collins attempted to establish that Memorex's actions dissipated investors' faith in Memorex. These acts included its accounting practices, which were scored by the Securities and Exchange Commission, management practices and changes in management, as well as the IBM suit alleging wrongful appropriation of IBM secrets on the 3330.

But Collins maintained the underlying problem was the lack of capital.

A report by L.D. Duane Kirkpatrick of G.A. Saxton, another investment firm, reviewed the effects of IBM actions on the peripherals industry. "There was an immediate retrenchment and a cessation of new entries into the business. BASF, Tractor, Marshall, Bucode, Peripherals General and Texas Instruments have either merged with other companies or are no longer a factor in the end user business. Within the tape and disk product areas, there have been new entries," the Saxton report said.

IBM Slice Smaller in '77

(Continued from Page 59)
of its CPUs in the federal government by 17%, to 886 processors from 752 the year before. Fifth place DG went up in number of CPUs from 526 to 724, a gain of 38%.

HP, with 641 processors in fiscal 1977, gained 28% over the 499 CPUs it had installed last year. CDC, on the other hand, lost four processors, dropping from 519 in fiscal 1976 to 515 CPUs by October.

Ninety percent of the government's computer processors are owned. Owned CPUs represent 79% of the total dollar value of installed processors, however.

The total $4.77 billion in federal computer equipment includes $1.57 billion in CPUs; $1.69 billion in storage devices; $971 million in I/O devices; $277 million in communications terminals; and $259 million in other types of DP equipment.

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Dealer Predicts 'Bloodbath' for 370 Lessors

PHOENIX — IBM 370 lessors should prepare now for the upcoming "bloodbath" that IBM's 3031, 3032 and 3033 will inflict on the financial community, Adolf F. (Sonny) Monosson, president of American Used Computer Corp., warned here in a recent seminar sponsored by the American Association of Equipment Lessors.

Although more than $1.3 billion has been invested in IBM 370 leases, the majority of these agreements will require at least a 20% residual to recoup the capital investment, according to Monosson. But IBM 370s will not sell at these hypothetical residuals, he warned, because few investors anticipated the high rate of technological advance.

Thus, errors in underestimating residual values could lead to "horrendous" consequences, especially for publicly owned companies, Monosson said.

If residuals drop so quickly in the computer field, why did the leasing industry book more than $1 billion of 370 equipment? Several factors have caused the lessors' apparent blindness to the impending disaster, which recalls the similar fiasco that befell IBM 360 leasing companies in 1973, Monosson explained.

First, lessors of 360 and 370 equipment are not the same kinds of firms. Unlike the big dealers of 360s, which are independent leasing outfits, 370 companies are either commercial financing institutions or private investors.

Investment bankers apparently remember the bitter lesson learned from their equity investments in the 360 lessors, Monosson concluded.

Highly profitable banks and industrial credit companies like GE Credit Corp. and Ford Motor Credit Corp. sought to use investment tax credits and the accelerated depreciation generated by their leases to offset taxes on their earnings, he added.

The second factor in the apparent blindness was the ability of lessors and packagers to get a Lloyd's of London insurance policy which guarantees 370 lease payments, provided the companies make a reasonable effort to remarket the equipment.

Lessors seemed to forget, however, that computers, unlike many other kinds of major equipment, do not increase in value with age, Monosson contended. On the contrary, they have steeply declining price/performance curves, reflecting the rapid pace of technological developments in the field and the sharp drop in components' costs since 1963.

Judge Rules TRW Director Cannot Serve on AM Board

WASHINGTON, D.C. — A Federal Trade Commission (FTC) administrative law judge recently ruled the former chief executive officer of TRW, Inc. cannot serve simultaneously on the boards of TRW and competing corporations.

Judge Joseph P. Dufresne determined that TRW itself was not involved in Horace A. Shepard's decision to serve on the board of Addressogrpah-Multigraph Corp. (AM) from Jan. 1, 1973 to Nov. 5, 1975 — a period when the two firms were competitors.

The judge called Shepard's joint membership an interlocking directorate because TRW and AM were at that time competing in the manufacture and sale of point-of-sale credit authorization equipment, teller-operated bank transaction equipment and similar devices.

This director interlock violated Section 8 of the Clayton Act, which prohibits joint board memberships where either of the corporations involved has capital surplus and undivided profits of more than $1 million and where the agreement to limit competition between would break the antitrust laws, the judge ruled.

Shepard's actions also violated Section 5 of the FTC Act, which prohibits unfair methods of competition and deceptive practices that effect interstate commerce, he added.

The judge urged Shepard "to make absolutely certain that this situation does not occur again" as he issued an order that would go beyond the corporate executive's assurances.

EFTA Charter Memberships Open Until March

WASHINGTON, D.C. — The Electronic Funds Transfer Association (EFTA) has extended its charter membership program until early March.

Charter member dues for the trade association, based here, have been set at $500.

The organizaiton is aimed at promoting the value of EFT technology and taking "a constructive role in stimulating a better understanding of EFT in the federal legislative sector, the organization explained in a recent news release.

"We have not yet begun to distribute."

A Special Report on Distributed Data Processing
in our February 27th Issue

According to independent studies by Becker Research, Inc., only 20% of *Computerworld* subscribers' organizations "currently use a distributed approach to data processing," so the buzzword of the late 70's has yet to become a byword.

On the other hand, 27% of *Computerworld* subscribers say their organizations are now "planning to use a distributed approach to data processing" — which indicates a substantial current interest in what some have called the wave of the future.

Of course, there are still wide differences on just what is meant by distributed data processing. And that's one of the topics to be covered in our February 27th Special Report.

Edited by Esther Surden, this report will gather opinions on what DDP is from several sources, including mainframe manufacturers and users.

It will also give some practical help to DDP users and prospective users — with articles on configuring networks, distributing data bases, and selecting and maintaining equipment.

Distributed Data Processing will also report on users' experiences with DDP — both pro and con.

If you're into DDP, planning to be into it, or thinking about it at all; this report is the place to be when our February 27th issue reaches your desk. Closing date is February 10th.

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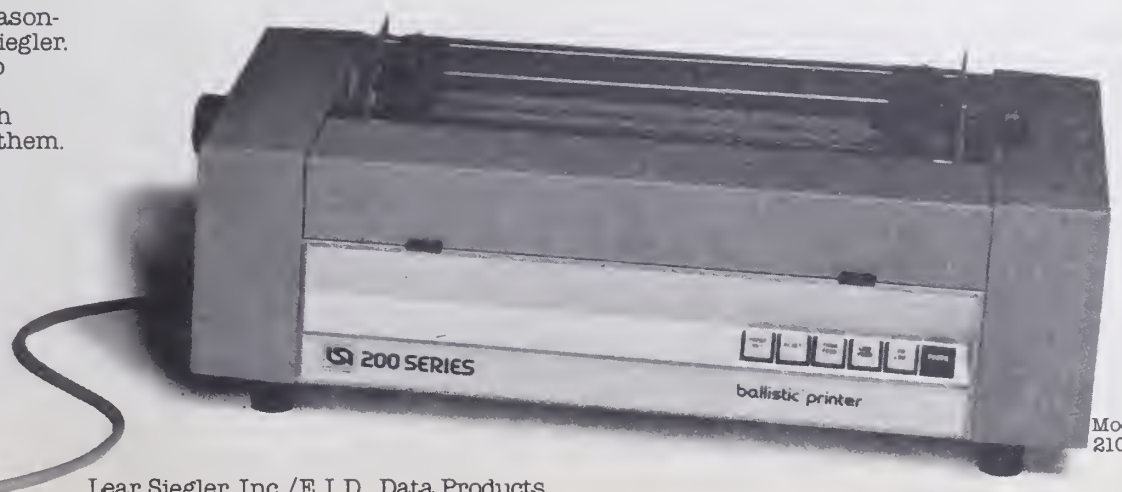

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Calculations Show Japan DP Not the Dragon It Appears

By Bohdan O. Szuprowicz
Special to CW

Japan, now into its second government-sponsored "Program for Promoting More Sophisticated Use of Computers," appears to be driving relentlessly toward becoming the leading computer user and manufacturer in the world.

The Ministry of International Trade and the Ministry of Posts and Telecommunications jointly formulated a program to increase the total installed value of general-purpose computers to $18.2 billion by the end of 1980. This is 2.5 times the Japanese hardware base that existed at the end of 1975.

Japan is already the undisputed No. 2 in total computer installations, value of equipment and hardware manufacturing capabilities, outpaced only by the U.S. At the end of 1976, there were almost 39,000 general-purpose computers installed in Japan — almost as many as in France, the UK and the Soviet Union combined.

There were also 14,060 minicomputers as well as large quantities of small business computers.

Only yesterday it seemed it was still a toss-up whether Japan or West Germany was the second largest computer power in the world. Today Japan has almost twice as many general-purpose computers as Germany — $8.1 billion worth, which is also almost twice what all the German computer installations are worth.

Country	Estimated General-Purpose Computer Installations in 1976	Value In Millions of U.S. Dollars	Non-Agricultural Labor Force in Millions	Number of Computers per Million of Non-Agricultural Workers
U.S.	170,000	34.0	92	1847
Japan	39,000	8.1	47	829
West Germany	21,000	4.4	25	840
United Kingdom	15,500	3.5	25	620
Canada	14,000	2.4	10	1400
France	13,000	3.6	20	650
USSR	12,500	4.5	103	121
Switzerland	2,300	1.3	2.5	920
Brazil	1,800	0.5	17	105
China	1,000	0.25	50	20
India	350	0.1	60	6
Taiwan	76	0.02	4	19
Sri Lanka	9	0.001	2	4

The above chart, compiled from various sources, shows the estimated inventories of general-purpose computers in selected countries.

Japan appears to be well ahead of the Germans and rapidly closing in on the U.S. to become the leading computer power in the world.

But Japan is nowhere near the American computer usage levels and is still behind West Germany and several other countries where it really counts. It is so because sheer numbers of computers are a poor and deceptive indication of a country's sophistication in their deployment and application.

What must be compared is not even the number of computers for every million of inhabitants, as economists sometimes do, because it distorts the true picture in countries with large peasant and illiterate populations. Rather, the number of computers available for every million of the nonagricultural labor force in a country gives a better picture.

Looked at in this way, the Japanese computer power dragon shrinks to its proper size. There are, to be sure, 829 general-purpose computers for every nonagricultural working million in Japan, but there are 849 machines for every million of nonfarming German workers also.

Swiss Use More

Neither Germany or Japan are anywhere near the U.S. or Canada, where comparable computer availabilities are 1,847 and 1,400 machines for every million of the industrial labor force respectively. In fact, even little Switzerland with a mere 2,300 computers utilizes 920 machines for every million of its nonfarm workers.

Recent projections published by the Japan Electronic Computer Co., Ltd., which finances the purchases and operation of Japanese-made computers by Japanese users, indicate Japan plans to have at least 106,000 general-purpose computers in operation by the end of 1985.

This would give Japan about 2,000 computers for every million nonfarm workers. But there is already little doubt the U.S. will still be well ahead, probably with at least 2,500 computers for every million workers at the time.

Industrialized countries will all very soon reach and surpass computer utilization levels of 1,000 units for every million nonfarm workers. Now the state of industrial and bureaucratic modernization in other countries can also be assessed by comparison.

Brazil, for example, with a vigorous computer manufacturing program and continuing imports, may soon be able to catch up and even overtake the Soviet Union on this count unless there are very many more computers in the Soviet military-space establishment than is suspected.

Keep in mind, your prime prospects will be at Computer Expo '78... so will your competition.

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Microprocessor Features Clock Oscillator

SANTA CLARA, Calif. — The S2000 microprocessor from American Microsystems, Inc. has a clock oscillator, a 4 microsec cycle time, 8K bits of read-only memory (ROM) and 256 bits of random-access memory (RAM).

The TTL-compatible S2000 also includes 13 outputs, eight inputs and eight bidirectional tristate I/O lines, the firm said. A seven-segment display decoder and LED drivers are included in the architecture.

OEM Products

The NMOS microprocessor has an arithmatic logic unit, a control section and three registers for addresses and intermediate values.

Firmware consists of 51 instruction codes, including skips similar to those in the Digital Equipment Corp.'s PDP-8 instead of conditional branching, a spokesman said.

The microcomputer operates with either a 9 Vdc power supply or dual supplies of +5 and +9 Vdc. Typical power dissipation is 360 milliwatts.

Software for the S2000 consists of a macro assembler, a development/-debug module, a simulator to determine program function and a text editor.

Available in 40-pin plastic or ceramic packages, the unit costs $10 in quantities of 5,000 to 10,000 from American Microsystems, 3800 Homestead Road, Santa Clara, Calif. 95051.

Elpac System Powers Micro

SANTA ANA, Calif. — A microprocessor power supply that is convection cooled and features isolated outputs for positive or negative operation has been announced by Elpac Power Systems.

The UPS-35 specifications include integrated circuit regulation, remote sensing/programming, foldback current limiting, an electrically shielded transformer and a full rate output from 0°C to 55°C, 105-125/210-250 Vac, the firm claimed.

No heat sink or forced air devices are required because of the UPS-35's cooling system; the unit does not exhibit overshoot under conditions of power on, off or failure, a spokesman said.

The power supplies are priced at under $50 in quantities of 100 from Elpac Power Systems, 3131 S. Standard Ave., Santa Ana, Calif. 92705.

Octal Buffers Expand Monolithic Interfaces

SUNNYVALE, Calif. — Monolithic Memories, Inc. has announced bipolar octal buffer circuits for use in microprocessor systems with 8-, 16-, 24- and 32-bit data widths.

The buffers are said to be suitable for programmable read-only memory (Prom) and standard I/O bus applications.

Designated SN54/SN74S240, S241, and S244, the buffers feature eight bus drivers, inverting and noninverting outputs and a choice of active-low or active-low-and-active-high enable.

The buffers sell for $4.40 per unit in quantities of 100 to 999 from Monolithic Memories at 1165 E. Arques Ave., Sunnyvale, Calif. 94086.

Card Offers 1K RAM

MONTEREY, Calif. — Pro-Log Corp. has announced a programmed logic system with 1K bytes of random-access memory (RAM) on a single card and sockets for an additional 1K of RAM and for 8K of programmable read-only memory (Prom).

The PLS-888 card includes an 8080A microprocessor, crystal clock and power-on reset; it is plug-compatible with Pro-Log's other single-card 8080A-based system, the PLS-881.

The PLS-888 sells for $195 each in 100-piece quantities from Pro-Log, 2411 Garden Road, Monterey, Calif. 93940.

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Displeys 11 lines of 26 cherecters/lina. Buy Tiny Basic now $49.95 end whan you buy tha expansion peckege return Tiny Basic end gat a full refund of $49.95. This limited time offer is aveilable only from NCE/Compumart.

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For further information about these openings, you are invited to telephone Dr. David Karlgaard, toll free at (800) 336-0173, Ext. 136.
Or forward your resume and salary requirements in strict confidence to Dr. David Karlgaard, Manager, Computer Systems Architecture, Dept. 207

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Throughout development of the system, detailed performance measurement will be critical to the design. We are looking for professionals with a knowledge of analytical modeling and discrete simulation, and an interest in applying them to real system problems.

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Must be capable of supporting front-end communications processor development for Xerox and other computers leading to supervisor positions.

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We seek professional sales and sales management individuals who have established performance sales records in total systems. Medium to large scale systems background is preferred as well as broad gauged applications. Only quoted performers should apply for this position. In addition, a suitable BS degree would be helpful.

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We prefer individuals with heavy exposure to pre- and post- installation problems. A thorough knowledge of electronics, especially CPU's, disc drive and other peripherals will be necessary for successful customer support. Medium to large scale computer systems experience is desirable.

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Due to the rapid introduction and sale our our S-100, S-200 Computer System, which incorporates the VULCAN, multi-purpose virtual operating system, our Quality Assurance group has established this new growth position. The individual we seek must have a BS or MS degree in Computer Science or math and a minimum of 5 years' solid experience in operating systems coupled with some in-depth exposure to compilers. Language capabilities should include both verbal and written, will be necessary. Functional responsibilities include: establishment of Quality Assurance tests with appropriate documentation and advance planning for continuous software testing. In accomplishing these tasks, vertical and lateral communication with key management personnel will be expected. Software oriented individuals with familiarity with CPUs and Operating Systems from CDC, H-P, DEC, UNIVAC, and/or IBM will help in determining applicant's success.

DIAGNOSTIC ENGINEERS

Immediate openings in our Engineering area for digital hardware and diagnostic software engineers. We require a possession of in-depth knowledge of software design/implementation, digital fault isolation and protection procedures. Successful candidates will be degreed in engineering or possess suitable on-the-job experience.

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Two positions exist at our Fort Lauderdale location in the Computer Systems Engineering Department. The first position involves peripheral systems and will be responsible for the development of magnetic tapes and disc storage systems, including the specification and design of system controllers, evaluation and selection of existing OEM products and advanced product planning. Additional responsibilities include project scheduling, budgeting and supervision of technicians.

The second position involves computer terminals and the development of computer terminal systems as they would relate to CRT's and teleprinters, including terminal system and subsystem logic design; also, advance product planning, project scheduling and budgeting, as well as supervision of development technicians.

Both of the above positions require a Bachelor's degree in electrical engineering with 3-6 years' experience for peripheral systems and 2-5 years' experience in the case of computer terminals.

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Individuals experienced in the design and development of digital computers will be most welcome in our engineering development area. We prefer degreed individuals having a minimum of 2-5 years' experience in the development of CPU circuit design.

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Will diagnose and resolve manufacturing problems and analyze quality data in order to report unfavorable trends and the cost of quality. Will initiate corrective action; conduct quality audits of manufacturing and inspection processes; write QC standards, procedures and process inspection instructions; evaluate the disposition of non-conforming material; represent QA at equipment design reviews and ECP meetings. BSEE, ME or IE with 5-6 years' quality engineering experience, preferably in the EDP environment.

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Several positions are available to marketing which includes the following areas: software development, which includes the development of systems software or the development of high level compilers.

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We are seeking a programmer to work on various applications to be implemented in all the schools in the Georgia University System. Experience should include 3-5 years Cobol and extensive work with large scale computers. Familiarity with IBM 370 under MVS, IMS, TSO, and OS JCL is highly desirable. Must be willing to do maintenance programming as well as development. Previous work with CRT applications a definite plus.

Salary competitive. Excellent fringe benefits include 5 weeks leave/holiday, generous sick leave, and free individual group life and health insurance.

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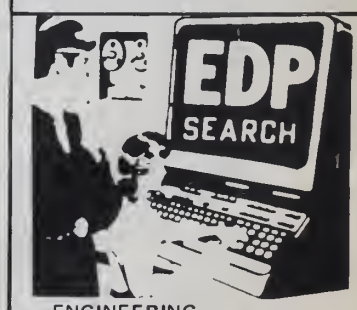

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We Never Pass Out A Laundry List

Romac policy forbids using the "Laundry List Technique." Other personnel consultants send out huge lists of names to prospective employers, we never do. Romac supplies its clients with only the best qualified professionals.

No professicnal wants his career bunched with countless other more or less qualified candidates. He wants special attention and consideration from his personnel consultant. The Romac Partners see to it that he gets it. That's the Romac Difference.

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Requirements: College degree + 6 yrs professional experience in computer based systems design or operation, 2 yrs supervisory level. Experience as required may be substituted on a year-for-year basis for required college.

Send resumes to: H.F. Goodwin, Management Systems & Services Director, Dept. of Health & Rehabilitative Services, Office of Management Systems, 1323 Winewood Blvd., Tallahassee, Fl. 32301.

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ADR is the #1 software products company in the world. Founded in 1959, we have software installed at over 8,000 computer sites, more than any other independent software company. We are large enough to be stable and respected, small enough to be informal, with lots of room for recognition and advancement. We currently employ over 280 people and our annual sales exceed $20,000,000. ADR has 8 branch offices in the United States and is represented in 35 foreign countries.

The Products

ADR's diverse product line is state-of-the-art. Our systems range from on-line programming systems to language translators; from text processing to performance measurement. IBM technological advances are usually heralded by new ADR products. ADR software products are rated #1 in the 1977 Datapro survey — surpassing every other company in the number of products (4) honored by Datapro.

The Environment

ADR offers the comfortable, informal surroundings best suited to system development. At ADR, members of the technical staff average twelve years of computer experience. They constantly have opportunities to expand their professional skills into new technological areas. Our role as a pioneer in the software products industry gives our employees a unique position in the computer industry. At ADR, you are part of the leading edge of technology, not a follower.

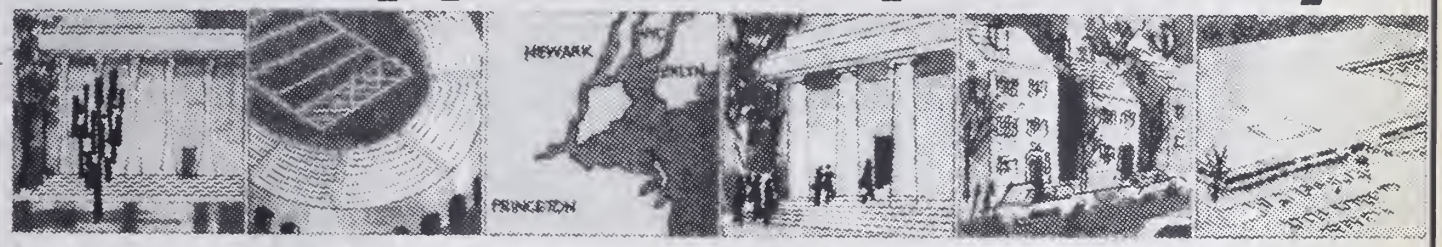
Openings for Systems Software Development

If you are a capable IBM Assembly language programmer and consider yourself a System Software Specialist, then you definitely should consider ADR. We have openings at all levels for qualified programmers and analysts who have the capabilities for developing sophisticated, state-of-the-art software. Experience with online systems (CICS, TSO, etc.) or knowledge of OS internals is a definite plus. If you have participated in the development of any type of software packages — system, utility, or application — we would really like to talk to you.

Openings for Systems Software Support

ADR knows that its products can only be as good as the service we give our customers. If you like dealing with people, enjoy an occasional trip, and have strong communication skills, you might consider a support position at ADR. To qualify, you should have a strong technical background in IBM computers and operating systems, and a college degree. As our product line continues to expand, our product support needs will grow as well. You could be a part of that growth!

This may persuade your family...



Princeton: A Top Ten Town
Princeton is on almost everyone's list of the ten best American communities in which to live. Yet it is suprisingly affordable. It offers not only beauty and serenity but a wide variety of cultural, sporting, and educational activities

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It's been said that Princeton has almost as many tennis courts as people. You can also sail, ice boat, and skate on Lake Carnegie. Or jog to work. Or golf at one of the many courses in the area.

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You can live next to the old Raritan Canal, on a golf course, or in an old grist mill. Princeton and other beautiful communities nearby can fill your needs for an apartment or home at every price level

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In the summer of 1979 ADR will be moving to a new 65,000 sq. ft. building on 40 wooded acres in the foothills of the Sourland Mountains. This new site is less than a mile from ADR's current location.

Please send your resume in complete confidence, including current salary and position desired, to:
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Major NYSE company has an immediate growth opportunity for an ambitious, highly motivated individual to audit all data processing functions (computer security and department/interdepartment controls).

Credentials should include:

**Degree in Accounting or Business*
*Minimum 5 years experience in Data Processing *Ability to communicate effectively with all levels of management.*

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Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

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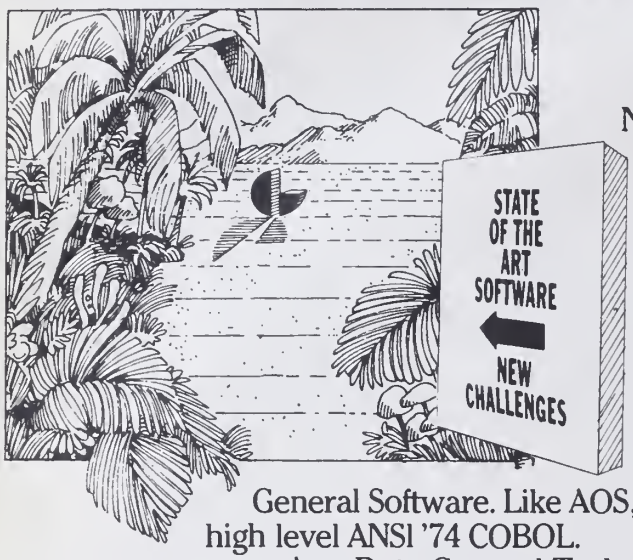
RSVP SERVICES
Employment Agency for Computer Professionals

SOFTWARE WIZARDS: BORED WITH ROUTINE WORK? COME TO THE DATA GENERAL OASIS.



Naturally you're parched. Too much of the software you're working with has gone old, stale and dry. But now's your chance to work with some of the most advanced software in the world. Data General Software. Like AOS, Idea, INFOS and high level ANSI '74 COBOL.

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This job not only means you'll be moving up into a position with more freedom, and greater challenges, but you'll also be working for the most exciting, fastest growing minicomputer company in the world. Data General.

If you feel this is the kind of opportunity you've been waiting for, please forward a resume, including salary history, in confidence to Ms. Joanna Flint, Data General Corp., 235 Old Conn. Path, Framingham, MA 01701. Or call Joanna at (800) 225-4623 (in Massachusetts call collect (617) 620-1200).

Data General

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Expanding International Big 8 CPA firm seeks computer systems professionals for openings in New York, Boston, Washington, Cleveland, Atlanta, Chicago, Kansas City, Los Angles, San Francisco, Houston and other U.S. offices. Skills in two or more of the following areas are required:

- Evaluation and selection of hardware and software;
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Qualified individuals must possess B.S. degree (Master's degree desired), up to five years recent in depth technical data processing experience, strong skills in oral and written communications, programming and/or system analysis. Travel required depending upon location. Salary in the $17-28,000 range.

For an outstanding career in management consulting, submit resume including salary history and geographic preferences to: Dept. CW C/O R. Dieckmann, 38th Floor, 345 Park Ave., New York, N.Y. 10022. An equal opportunity employer, M/F

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air traffic control systems

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CSC is constantly expanding in the information sciences industry all over the world in governmental, commercial, and industrial systems.

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Greg Lattus

Call Collect: (904) 355-9687

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System Sciences Division
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A sales professional with 5 years of solid sales management experience to spearhead the building of a highly qualified sales force. This individual should be able to single-handedly put together a team of successful sales professionals capable of generating sales and lease financings on the multi-million dollar level within 1 year. Markets of initial interest include Fortune 1000 accounts and medium sized municipalities. We are qualified as an OEM with a major mini-computer manufacturer and intend to broaden considerably our involvement in this area. We have developed proprietary software packages aimed at the Fortune 1000 and Municipal markets. In addition, we are a major equipment leasing company controlling equity dollars in the range of $25,000,000 and an equipment lease portfolio exceeding $75,000,000.

Compensation arrangements are open and subject to past experience.

Interested parties should respond in confidence to:

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Entrepreneur wanted as working partner for two year old corporation specializing in minicomputer turnkey systems. A small investment and a lot of motivation are the only requirements. Full ownership is possible. Contact:

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DIBOL PROGRAMMERS

A rapidly growing DEC OEM in Florida is looking for trained DIBOL programmers with at least one year's experience on DEC mini-computers. Company does $3,000,000 in business with great opportunity for personable, birght, young programmers. Salary open. Send current picture and resume with salary history to Dan Kopack, Digital Systems, Inc., 1818 N. Palofox, Pensacola, Florida 32501.

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COMPUTER SALES

We are looking for sales professionals to sell our mini-computer systems to end-users. For the right individuals, these are truly unique and unusual opportunities for career and financial growth. To be considered, applicants must have prior sales/marketing experience in the mini-computer and/or small computer business systems marketplace. Compensation will include base salary plus incentives, and a liberal employee benefit package. Send detailed resume including current earnings to our Sales Manager.

CW Box 1418
797 Washington St.
Newton, MA 02160
EOE/MF

DATA PROCESSING SOFTWARE SPECIALIST

Generate and maintain operating system. Provide technical help to telecommunications specialist, data base specialist, and Operations Department. Write special subroutines and optimize operating system. Should be familiar with OS-MVT or OS-VS maintenance and generation. Requires 1 to 2 years experience as system programmer. Call (503) 225-5272 for appointement, or send resume to Blue Cross of Oregon, 100 S.W. Market St., Portland, Oregon 97201.

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Rhode Island

As a leading New England commercial bank, we have created an unusual opportunity for a career-minded Systems Analyst. The challenge involves the design and implementation of an on-line network within a medium-large IBM 370 OS/VS environment with the opportunity to apply "state-of-the-art developments in computer technology. A sound programming/systems analysis background and good verbal communications skills are required. Salary mid to upper teens. Inquiries will be handled promptly and in strict confidence. Send resume to:
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PROGRAMMER ANALYSTS

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PROGRAMMER ANALYSTS

Seeking Career Opportunities With-

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INNOVATION
DEVELOPMENT

Federated Department Stores, a national leader in retailing, has a major systems development program in progress that is committed to developing advanced retailing systems incorporating data base and distributive processing capabilities.

Advanced technologies include:

IMS/VS • MVS • NCP • SNA

VTAM • VSAM • TSO • Data Dictionary

Methods include Top down design, HIPO, structured walk through simulation

There are still some ground floor opportunities at the forefront of design and development for PROGRAMMER ANALYSTS who have above average credentials and would like to embark their careers in our long term retail systems research and development program.

If your background includes solid COBOL programming experience on large scale IBM equipment with exposure to IMS concepts, and you're ready to advance your career in a highly professional environment, working with concepts that are ahead of existing technology, then send your resume, including recent salary history to: MR. FRANK McKAIN.

Federated Department Stores, Inc.

Systems Research & Development-Room CW206
222 W. Seventh St., Cincinnati, Ohio 45202

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Does your present job offer all the opportunity you want?

Does working for the nation's leading supplier of financial software interest you?

Are you free to be creative?

Does being a part of a fast growing, on-line oriented bank servicing data center excite you?

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FLORIDA SOFTWARE SERVICES PROVIDES APPLICATION PACKAGES AND BANK SERVICES FOR OVER 1000 BANKS THROUGHOUT THE NATION. COMPENSATION PACKAGE INCLUDES:

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Must be experienced in Management. Requires knowledge and ability to develop and manage systems and data flow. Will be involved in planning and controls. IBM 370 and Burroughs Hardware.

APPLICATION PROGRAMMER/ANALYSTS

Must be experienced, Cobol programmers. Familiar with bank applications. On-line experience helpful. IBM 370/Burroughs systems.

If you are qualified, we have the perfect opportunity for you. We offer unlimited possibilities for growth and advancement.

Send your resume today in strict confidence to:

Personnel Director

FLORIDA SOFTWARE SERVICES INC.
P. O. Box 2269 • Orlando, Florida 32802

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EDP Auditors To $25,000. Dg, 2 yrs Mfg EDP Audits exp.
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All employment expenses paid by client cos. For details on the above, contact in conf J. Schwab, (704) 375-0600, FOX-MORRIS PERSONNEL CONSULTANTS, 1742 Southern National Center, Charlot8te, N.C3. 28202.

EDP PROFESSIONALS

PROGRAMMER/ ANALYST

CITY OF DULUTH, MINNESOTA

Ground floor opportunity in municipal DP center. PA will conduct system design in expanding user base necessitating installation of larger computer with capacity to handle tele-communications and data bases. Qualified candidate will have solid experience in user contact, system design, program implementation, and ability to direct/evaluate programming efforts.

Salary Range $14,436 to $19,944, depending upon qualifications. Excellent fringe benefits.

Send resume by February 17, 1978, to:

J.A. Hayden
Personnel Department
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COMPUTER ENGINEERS

Join an aggressive computer organization that is engaged in a five-year program to modernize and streamline the car engineering process. Applications development requirements span data acquisition, prototype testing, performance simulation, design analysis, and information control systems. Facilities used include CDC, Honeywell and IBM data centers, and dedicated computers such as dEC System 20, PDP 11's, and microcomputers. Experienced personnel are needed for:

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Laboratory data acquisition, engine mapping, electronic engine control, performance simulation and optimization, numerical control, microprocessor control, diagnostic testing, and data communications.

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INFORMATION SYSTEMS

Part and design data, weight and material control, and product releasing, option codification and configuration control, model program timing, product change control, warranty data, reliability and durability analyses, and related on-line data base and interactive data entry/retrieval techniques.

You must be an innovator and be capable of complete project leadership from analysis of requirements, systems design, program specification, to launch of the needed computer facilities and systems features. Please submit your qualifications so that we may discuss a challenging career opportunity commensurate with your academic and practical background. Send resume to:

Ford

Car Engineering
Attn: J.B. Shaw
Salaried Personnel
P.O. Box 2053
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An Equal Opportunity Employer

others talk about it — we've got it

GROWTH

MINI-COMPUTER FIELD POSITIONS

Become part of Sperry Univac's growth to leadership in the mini-computer world!

SALES ENGINEERS

Weigh these advantages:

- The best commission plan in the industry.
- Competitive products to sell.
- A highly respected, worldwide customer engineering support organization.
- Challenge and real growth opportunities.

Requirements:

- Minimum 2 years mini-computer sales experience in the Data Base, Data Communications and/or Distributed processing marketplace.
- Record as a closer.
- Technical competence in hardware and software.
- Record of maintaining account relationships.
- Ablity to obtain new and repeat business.

FIELD SYSTEMS ANALYSTS

Key responsibilities in:

- Marketing headquarters interface.
- Sales/proposal preparation.
- Defining and solving customer requirements.

Requirements:

- Technical degree desirable.
- Creative problem solver.
- Minimum 2 years pre and/or post sales support.
- Real-time commercial (Data Base, Data Communications, Distributed Processing) and/or real-time scientific applications.

If you're a leading performer with your current company, don't pass up this opportunity to make a smart move.

You will find:

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- Room for advancement.
- Achievements recognized.

Openings in the following areas:

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For more information, call Al Sack at 714/833-2400 (COLLECT). Local interviews may be arranged.

SPERRY UNIVAC

MINI-COMPUTER OPERATIONS
2722 Michelson Drive, Irvine, CA 92713

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Faculty Position

ASSOCIATE EDUCATIONAL SPECIALIST

COMPUTER SCIENCE

You'll provide support services, academic advising, tutoring, note-taking, interpreting, career guidance, and coordinate research activities for identifying jobs available to deaf students. M.S. Degree in Computer Science/equivalent educational experience and willingness to learn Manual Communication required.

Minimum four years' teaching/industry preferred including use of timesharing terminals, graphic displays, XSD computer operations, programming and application, Hardware/Software Systems Design and Analysis.

Personnel Coordinator - CW

This position carries faculty rank and can lead to a tenure. Send CV in strict confidence to:

National Technical Institute for the Deaf
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One Lomb Memorial Drive, Rochester, New York 14623
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Marketing Manager

Market Segment Manager Communications Industry

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Government Marketing Program Manager Digital Systems

We are looking for a marketing program manager who has experience with government procurement organizations. Direct experience either selling to or operating within government agencies would be a distinct advantage.

The product line includes digital components and systems that require an understanding of digital hardware and software (e.g., A/D conversion, minicomputers and BASIC).

Educational background should include business and marketing courses and experience or qualification in electronics or electronic systems.

TEKTRONIX, INC., is a rapidly growing Fortune 500 Company that develops, manufactures and markets internationally recognized precision electronic instruments, computer peripherals and related electronic instrumentation. Located near Portland, Oregon we are within a two hour drive of the Cascade Mountains and Ocean Beaches. The close-by natural playgrounds and the City of Portland provide a variety of recreational and cultural interests.

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Send detailed resume and salary history to Art Andersen, TEKTRONIX, INC., P.O. Box 500, C74, Beaverton, Oregon 97077 or call Art Andersen at 800-547-1164 (Toll free) or collect 503-644-0161, extension 7043.

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COMMITTED TO EXCELLENCE

Programmer & Systems Engineers

We seek qualified individuals to fill the following key positions in our Richmond headquarters.

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Individual to assist in the analysis, development and programming of computer systems. Prepare necessary systems and program documentation. Must be able to communicate effectively with users, and program proficiently in COBOL. BASIC and Teleprocessing a plus. Degree preferred with experience in programming and systems analysis.

Systems Engineers

Develop new products and software including operating systems, language processors and application packages for building automation, energy management and process monitoring/control. Background in real time programming, primarily FORTRAN. D.G. experience a plus. Mini or micro computer experience an asset.

Liberal starting salaries plus incentives. Excellent benefits.

Reply in writing stating qualifications to AJ. Falco, Personnel Manager or call Mr. Falco at (804) 288-3081

Robertshaw Controls Co.

P.O. Box 27606 Richmond, Virginia 23261
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COMPUTER ASSISTED INSTRUCTION ASSOCIATE COORDINATOR

Northern Plains
Consortium for Education

DESCRIPTION OF POSITION: Assist Consortium of six North Dakota colleges in implementing computer programs which will augment instruction in undergraduate social and natural science courses. Aid in analyzing, designing and coding systems and programs rquested by college instructors, and conduct technical training programs and subject matter seminars in computer assisted instruction.

REQUIREMENTS: Extensive knowledge in developing and implementing computer assisted instruction packages and courses. Knowledge of an interactive computer language and interactive computing. Doctorate or near doctorate required. One or more years' experience in college level teaching which involved use of a computer as a teaching tool would be beneficial.

ADDITIONAL INFORMATION: A twelve month position available July 1, 1978. Minimum salary $18,000. Send resume, statement of interest and qualifications, and list of three references to:

Norther Plains
Consortium for Education
Jamestown College
Jamestown, N. Dakota 58401

An AA/EOE

Systems Analysts Programmers

Our International Financial Systems Division has an immediate need for individuals with expertise in the following areas:

- Banking Applications
- COBOL Programming
- On-Line Transaction Oriented Systems
- Structured Design and Programming
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You will be involved in the design and implementation of an International Banking System using the latest hardware and software technology. These positions provide vital project team participation with opportunity for customer contact, international involvement and high visibility within our organization.

For further consideration, send your resume with salary history to:

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Department IBS
Corporate Executive &
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Career opportunities now available with a progressive data processing installation in one of the fastest growing electric utilities in the Southeast. Current environment includes IBM 370/158 and 370/155 OS-VS2, batch and on line applications using both CICS and TSO, several major new development projects. Installing 3031 in May 1978, 3032 in February 1979. We have immediate openings for the following:

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Must have experience in the design, analysis, and implementation of large applications. Strong accounting systems knowledge needed. Also, experience in projects involving property tax and tax depreciation concepts is helpful. Must have ability to function on systems with heavy user involvement. Strong technical background desirable. Degree preferred.

APPLICATION PROGRAMMERS

Requires 3-5 years experience primarily with COBOL. Working knowledge of structured programming concepts desirable. Experience with IBM hardware and software, OS-JCL, and CICS will be a definite plus. Degree in Computer Science, Math, Statistics or related area preferred.

PROGRAMMER/ANALYST

Needed to work in an engineering support computer organization. Wide range of application areas. Requires 2 years experience in PL1, COBOL, or FORTRAN and IBM-OS. Degree required.

SYSTEMS PROGRAMMERS

Requires a minimum of 2 years systems programming experience in medium to large scale IBM data processing installation, CICS, MVS, or SVS background desirable.

OPERATIONS SUPERVISORS

Requires management experience in supervision of medium to large scale IBM data processing installation.

Send resume and salary requirements to:

Ms. Martha Bryan
Department One
P.O. Box 1551
Raleigh, N.C. 27602

CP&L
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Continued expansion of our activities has created an immediate need for talented individuals at ALL LEVELS.

APPLICATIONS PROGRAMMERS
SYSTEMS PROGRAMMERS
ANALYSTS

Opportunity to assume Team Leader responsibility within a short time. We are currently operating sophisticated state-of-the-art hardware—twin 370/168's under OS, SVS, MVS.

Doubleday is located in the attractive, desirable suburban environment of Garden City, Long Island, within 45 minutes from New York City.

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I Am Interested In A Position As A _____
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COMPUTER TECHNOLOGY DEPARTMENT HEAD

Selection factors include experience in computer applications for business or commerce; teaching experience in an academic environment; evidence of leadership qualities; professional and peer recognition. Applicants should be knowledgeable in management, business, and personnel functions and activities. Relevant Ph.D. preferred. **Employment Date: July 1, 1978**

Two teaching positions: rank open at assistant or associate professor level. Full-time undergraduate teaching of computer technology courses. Minimum of M.S., preferrably in computer field. Computer related experience in teaching, plus experience in business, commercial, and/or industrial settings are prime selection factors. **Employment Date: August 1978**

Send complete resume to Dr. George W. McNelly, Dean, School of Technology, Purdue University, West Lafayette, Indiana 49707, by March 15, 1978. Purdue University is an affirmative action/equal opportunity employer.

COMPUTER OP. MGR.

to $30,000

MGM'T BACKGROUND. Should have exp. in converting to a 370/168 operation. Mfg. environment exp. with Dual 370/168, JCL, MES, or HAST desirable.

INFO SYSTEM STAFF

Three openings in prod. Inv. control, forecasting. Interface with upper mgm't Need degree & exp in IBM 370, IMS, COBOL, PSO, or HAST. Low to mid $20's starting salary. Co. Pays all fees. Contact A't Toht, (312) 665-4455, S-H-S INTERNATIONAL, 1616 E. Roosevelt Rd., Wheaton, Il. 60187 (Priv. search firm)

COMPUTER PERFORMANCE ANALYST

MID $20's

We are seeking a candidate with one to two years experience as a Computer Performance Analyst or three to four years experience as a Systems Programmer. This person will utilize hardware and software tools to monitor computer system performance and seek solutions to specific problems. Knowledge of IBM's Information Management System, IMS Performance Products and IBM's System Management Facility are required. Successful candidate will have worked in third generation hardware and software technology.

We are the largest Mutual Savings Bank in the Nation. Our benefits include: Free lunches, comprehensive medical insurance, tuition pre-payment, liberal vacation policy and an excellent incentive and investment program.

Please send resume and salary history to:

Physlis S. Lynch
Assistant Vice President

PSFS
12 S. 12th St.
Philadelphia, PA 19107
Equal Opportunity Employer M/F

Good Reasons to Move to Amdahl... Wherever You Are.

Amdahl Corporation is growing at a rapid pace, and we currently have outstanding opportunities in several areas across the country for topnotch people. If you seek increased responsibility and job expansion, perhaps you've been considering upgrading yourself and making a move to another area . . . but the realities of relocation hold you back. At Amdahl, we're prepared to help you make a significant—and, we believe, rewarding—move in your professional career. And we're prepared to assist you in that move with minimum disruption for you and your family, regardless of your present location.

We invite you to come and visit us. You will find an exciting and challenging environment, an excellent compensation and benefits package, as well as a friendly regard for human feelings and a sense of involvement that have characterized the company since we began. And we'll be happy to tell you about our fully paid relocation policy.

PROGRAM SUPPORT REPRESENTATIVES

You will be working as a field systems engineer as you carry the Amdahl philosophy of complete service to the customer. You will utilize your initiative, expertise and talents to aid the customer in restoring computer center operations regardless of the origin of the problem. You will assist Amdahl 470 customers in OS/SVS/MVS/VM conversions, problem determination, installation planning and support for new 470 users in one of the following areas:

Birmingham	Portland	Dallas
Washington, D.C.	Seattle	Chicago
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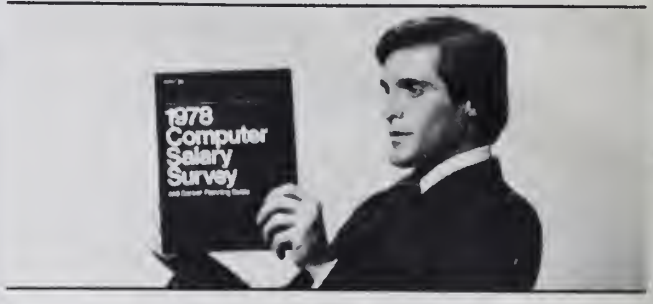

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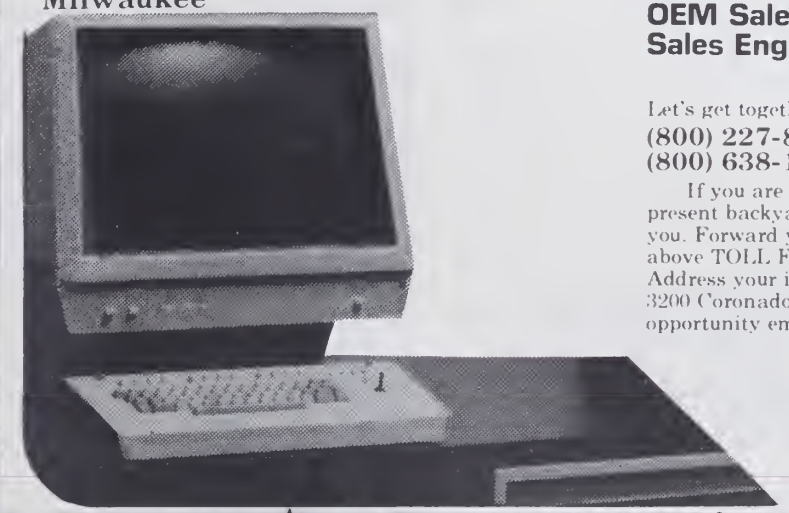

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San Antonio, Texas — San Antonio, Texas

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Large data center in Jacksonville needs person for responsible technical work in coordinating the field operations of systems throughout the state, individual must have experience in electronic test equipment.

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Send Resumes To: R.H. Hall, Acting Computer Services Admin., Dept. of Health & Rehabilitative Services, Office of Management Systems, P.O. Box 2016, Jacksonville, Fl. 32203.

SYSTEMS PROGRAMMER

Several positions in the Southeast and other areas. IBM, Burroughs and other large scale. Also mini-computers. Salaries to $24K.

TELEPROCESSING PROGRAMMER/ANALYST

Mostly CICS, some others. Several in Georgia, others in Southeast and Nationwide. Salaries to $20K.

SYSTEMS ENGINEER

Mini-computer experience. Most makes. Atlanta and other areas. Salaries to $30K.

SYSTEMS ANALYSTS & PROGRAMMERS

Too numerous to list. All makes and experience levels. Many in Atlanta and Southeast, others Nationwide. Salaries $12 to $23K.

ALL FEES PAID. Call (404) 262-2566 or send resume with salary requirement and location preference to:

JIM STAAL, Manager Information Systems Division

Whitlow & Associates
3390 Peachtree Road, N.E. - Suite 236
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Leading W. Va. Bank is seeking a data-processing professional to assume a major role in the expansion of its multi-bank dnata processing center.

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4 5 di Ty 12

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Excellent positions for Information Systems Analysts to work with management defining systems objectived, establishing detailed requirements, preparing user documentation and training users in systems operations. BS in Business or Math with 4-6 years' work related experience.

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The successful candidates will participate in the development of on-line manufacturing information systems. You will be working in an IBM/370 environment. 1-3 years' experience will qualify you.

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For immediate consideration, please send your resume to Professional Employment, 2201 Laurelwood Rd., Santa Clara, CA 95054, or call COLLECT (408) 246-8000, ext. 233. An affirmative action employer.

Siliconix

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We offer opportunities to participate in the design and development of on-line transaction processing software. You would also be involved with software interfaces to data base management systems. Candidates would be working with a software development team engaged in transaction processing software development for the NCR Criterion processors utilizing VRX.

To qualify for these outstanding positions, candidates would have a technical or computer science degree. One or more years experience in software development projects is required. A thorough knowledge of operating systems, assembler language programming, and real-time concepts are among the qualifications you would possess.

PROGRAMMERS (Assembler Language)

We are seeking programmers with a technical or computer science degree plus one or more years programming experience. Programming experience will be in assembler language.

MANUFACTURING SYSTEMS ANALYSTS

NCR is now involved in the development of an integrated, on-line Manufacturing Control System for use both in our manufacturing divisions and for sale to our customers. The system will address the following application areas:

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STANDARD COST
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This development effort has created opportunities in the following area:

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Major emphasis will be to prepare the system application software and documentation for external release for use on NCR's new Criterion computer line. To qualify the candidates' background should include one or more years systems and programming experience using COBOL in one or more of the above application areas. Ideally that experience will also include the use of data base and on-line processing.

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To investigate these outstanding opportunities, write to:

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NCR Corporation
Dayton, Ohio 45479

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SR. SYSTEMS PROGRAMMER

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U1108 EXEC 8 DMS 1100

The Unique Individual to fill this requirement, should have several years experience with Sysgens, Data Base Management Systems and exposure to High Visibility/User Interface. Prefer a M.S. MATH/COMPUTER SCIENCE/Other Hard Science Degree.

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If a call is not convenient, feel free to submit your resume, in confidence to:

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414 Hungerford Dr., Rockville, MD 20850
Representing an EOE Employer (Agency)

CICS SYSTEMS PROGRAMMER

International Corporation seeks CICS Systems Software Programmer with 1-2 years experience in DOS/VS CICS. Individual will participate in software/hardware enhancements in an expanding 370/148 data center network.

Convenient location in Boston suburb. Excellent fringe benefits. Salary commensurate with education and experience.

Please send resume including salary requirements in confidence to:

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WANTED:

A creative individual who has proven ability in business accounting systems design and programming.

Four years experience on PDP-8 or PDP11 hardware and RT-11, Dibol-8, or Dibol-11 operating systems required. Multi-terminal or on line data entry a plus.

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SYSTEMS PROGRAMMERS

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We seek systems programmers with knowledge of:

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- Design of I-O Routines
- Duties will include systems generation and installation, maintenance and updating of software, etc.
- Experience with micro-processor software helpful.

This is an outstanding opportunity to be where the action will be in data processing during the 80's. "INFORMATION PROCESSING" Please send resume with salary requirements to:

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FOR CENTRAL SYSTEMS AND COMMUNICATIONS ANALYSTS

Strong background in computer system measurements or modeling to aid in the design of our future high performance computer systems and distributed processing networks. Ideal experience will include:

- Development of H/W and S/W monitoring methodology.
- Application of H/W and S/W monitors to performance evaluation of current and future products.
- Analysis of H/W and S/W architecture in relation to system performance.
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If you have experience in one or more of these areas send your resume and salary history to:

Manager, Recruitment & Placement
Mail Station Y79
Honeywell Information Systems
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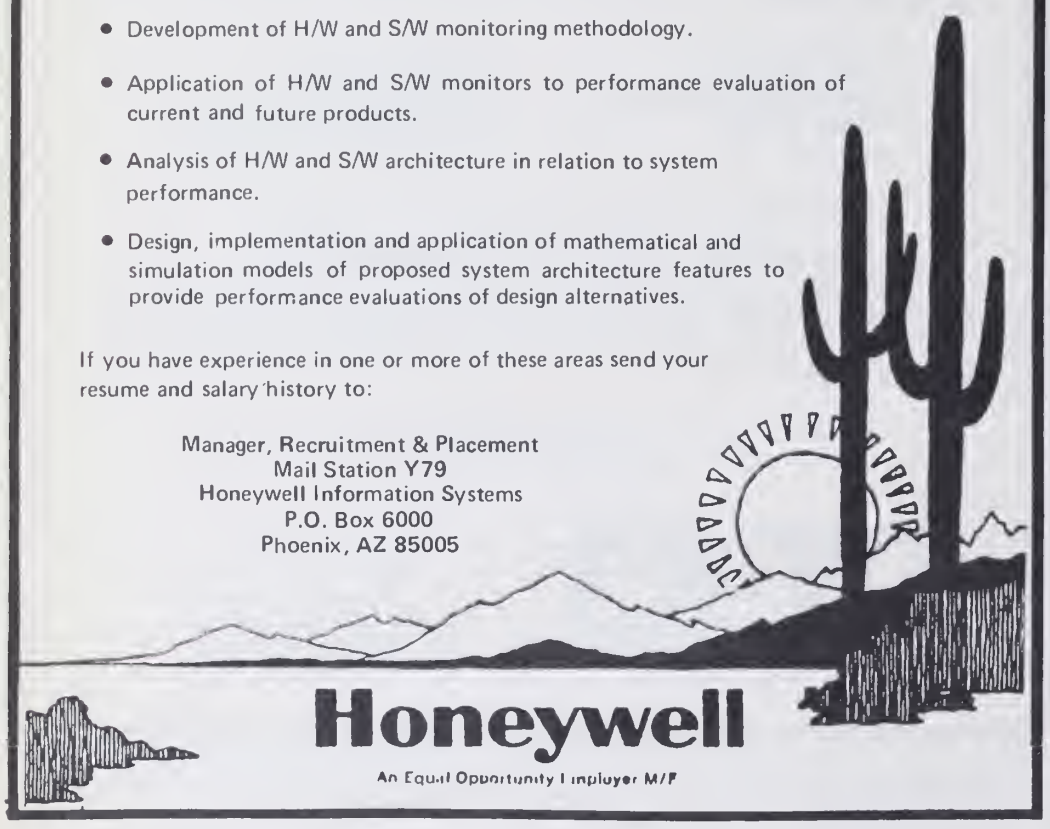
Phoenix, AZ 85005



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EG&G Idaho, Inc.,
the prime operating contractor
to the Department of Energy at
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Candidates should have a college degree or equivalent, and a minimum of 1 year experience in the development and implementation of business and management information systems along with proven capability in ANS COBOL. Experience with MARK IV and/or DBMS and knowledge of JCL for OS/MVT is desirable.

Idaho Falls is a medium-sized community located close to top-flight winter sports areas (Sun Valley, Jackson Hole, Grand Targhee) and unexcelled summer recreation areas (Yellowstone, The Salmon and Snake Rivers, The Grand Tetons).

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One year of Programming experience, with knowledge of the NCR Century 101, including Neat/3 computer language.

Ability to develop complex programs; write documentation, instructions and procedures.

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Position available at NSI's Research Triangle Park, N.C. facility for an individual with a minimum of a B.S. in Mathematics/Computer Sciences, and 2 years experience programming in Fortran and COBOL languages. Experience using EPA air quality emission data systems (AEROS & CDHS) desirable, but not required. Responsibilities will include developing and teaching courses on the principles and applications of Data Systems, as well as providing programming, data analysis and debugging support. For further information forward resume, including salary history and requirements to:

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Computer Selection Manager

Determine criteria for communications systems, maxi, mini, 6865 micro and peripheral equipment. Monitor new products and developments programs to assure earliest possible utilization. Coordinate between users and software section to insure smooth product interface.

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We're a major, northwest Illinois community hospital with a truly exceptional, career-capping opportunity for a Sr. Systems Analyst with the professional and technical expertise to potentially take us from time-sharing to full implementation of an independent, in-house operation. You'll have responsibility for computerizing the entire hospital, developing programs for comprehensive medical and financial information systems which will impact upon every hospital department. Reporting to the Director of Information Systems, you'll coordinate your efforts with Department Managers and computer service bureaus to arrive at project/problem definition, organization and scheduling and to recommend appropriate hardware and software, their costs and effectiveness.

This decision-making position requires a degree in Computer Science or Business Administration seasoned by a minimum of 5 years experience in a health care environment. In return for your contributions, we offer an excellent salary and complete fringe benefit package as well as the unique opportunity to "take charge." To arrange a confidential interview, send your resume complete with salary history and requirements to:

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An exceptional opportunity in a progressive, dynamic, rapidly changing hospital for a Senior Systems Analyst. We offer the opportunity to work with top management in the overall design and implementation of new systems.

Preferred qualifications include Masters Degree plus 4 years experience of which 2 years should be in the health care field.

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Submit resume, including salary history and requirement to Assistant Executive Director - Staff Services, University Heights Hospital, 1127 University Blvd. NE, Albuquerque, New Mexico, 87102. EOE M/F.

Programmer/ Analysts

San Francisco Bay Area

COMPILER DEVELOPMENT

A working knowledge of assembly languages and knowledge of compiler principles is required.

CYBER RECORD MANAGER

Experience in systems programming with higher level languages is highly desirable.

OPERATING SYSTEMS DEVELOPMENT

Experience in the file subsystem of an operating system is highly desirable.

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Develop tests for PL-1, ALGOL, FORTRAN, BASIC and system utilities. Proven ability as a leader of a technical project is highly desirable.

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Interface between the user and the computer system to assist with problem solution. A working knowledge of the CYBERNET SCOPE 3.4 and common products, such as FORTRAN, COBOL, UPDATE, SORTMRG, CYBER RECORD MANAGER, and COMPASS.

For immediate consideration, please send resume and salary history toK. Hardy, Dept. 50-A, 215 Moffett Park Dr., Sunnyvale, Calif. 94086.

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ANALYST - BANKING

Position requires some supervision of junior programmers, application systems designs, and programming. Experience with bank "On-Line" and batch systems desired. Presently using two Burroughs systems. Send resume and salary requirements to: David E. Jones, Vice President.

THIRD NATIONAL BANK

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ASHLAND, KY. 41101

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Rockwell Hanford Operations

is a prime contractor to the U.S. Department of Energy at the Hanford installation located in Southeast Washington State. We have immediate challenging and rewarding opportunities for experienced and creative Professionals. Systems applications range from large scale Interactive/Batch processing through dedicated minicomputers, real-time and on-line systems.

BUSINESS SYSTEMS ANALYSTS are needed for on-line materials management, maintenance management, accounting and personnel systems.

SCIENTIFIC ANALYST/PROGRAMMERS are required for dedicated real-time on-line minicomputer applications for inventory, surveillance and laboratory analytical analysis. Scientific applications background augmented with operating systems experience is desirable. Current hardware includes UNIVAC 1100/44, CDC CYBER 70, Model 74-18, Data General ECLIPSE C330, NOVA 840 and Varian 76. A number of additional systems will be procured soon.

Talented professionals are encouraged to immediately mail resumes to Gladys Clark, Dept. 6, ROCKWELL HANFORD OPERATIONS, P.O. Box 800, Richland, Wa. 99352.

Rockwell International
Atomics International Division
Rockwell Hanford Operations

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Denver, Colorado

Martin Marietta Data Systems offers superior opportunities in a business application environment for senior level Programmer/Analysts with at least 2 years' experience on IBM 370 systems. Your expertise will be challenged in application areas which will include Finance, Manufacturing, and Engineering Systems. Qualified candidates should have experience with OS or MVS, COBOL, and TSO. IMS batch and on-line experience is desirable.

Career opportunities also exist in our scientific applications programming area Applicants should present a strong engineering/mathematics background and have Fortran IV experience on large CDC computers. Experience on PDP computers is also highly desirable. You must have a minimum of 2 years' experience or a Master's degree in apprropriate field.

Martin Marietta provides excellent fringe benefits and relocation to Denver.

For complete information on making your career move to the Rocky Mountain region, please send your resume, including salary history, in confidence to Marvin Crandall, Manager, Human Resources.

MARTIN MARIETTA DATA SYSTEMS

Denver Data Center
P.O. Box 179
Denver, Colorado 80201

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If you possess 1-3 years experience in hardware maintenance of computers and/or related peripheral equipment; or you're an inhouse bench technician or design engineer looking to get into field service, we'd like to hear from you.

The people we seek are thoroughly knowledgeable in the principles of electronics. Requirements include an Associate's Degree, or equivalent electronics experience, and availability for some travel.

Our compensation package is quite competitive, and opportunities for personal and professional growth are unsurpassed.

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(512) 699-7317
9725 Datapoint Drive
Mail Station, 1B
San Antonio, Texas 78284

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COORDINATOR OF MANAGEMENT INFORMATION SYSTEMS

New position opportunity at West Virginia University. Under the Vice President for Administration, responsible for planning, coordinating and analyzing management information needs for academic and administrative users. Defines new information systems to support policy and administrative decision making. Bachelor's Degree or equivalent with work experience in management information systems, analysis and techniques. Thorough working knowledge of management information systems design and analysis, research methods and techniques and state of the art hardware and software. Supervisory experience. Forward resume of qualifications along with salary requirements to: Mr. E.J. Podeszwa, Personnel Officer, West Virginia University, Morgantown, W. VA. 26506. Please apply by February 28, 1978. West Virginia University is an Equal Opportunity/Affirmative Action Employer M/F

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CAREER OPPORTUNITIES

A major offshore engineering and construction company has the following positions available in its New Orleans based office:

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Responsibilities include developing and assisting in the implementation of technical data processing systems and procedures. Applicants should be degreed with 3 to 4 years in systems analysis, that includes 1 year or PL/1 experience. Knowledge of FORTRAN language helpful.

COMMERCIAL SYSTEMS ANALYSTS

Positions available for degreed individual with 3 to 4 years experience in systems analysis that includes 1 year of CICS exposure. Knowledge of DL/1 is desirable.

Degreed individual with 3 to 4 years experience in systems analysis. PL/1 and COBOL exposure is desirable.

Excellent benefits and starting salary. Send confidential resume to: MELISSA AVERETT.

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1. Minimum 2-3 years experience repair/troubleshooting CPUs, disk drives and line printers as well as other peripheral devices.
2. An Assoicate degree in computer technology, electronic engineering or equivalent military training
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We also have FIELD ENGINEERING positions available for those who meet the above requirements and possess programming experience in addition to knowledge of Operating Systems.

We will provide an extensive training program, excellent salary commensurate with experience, profit sharing and stock purchase plan.

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WANG Laboratories Inc.
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PROGRAMMERS

We need several information systems professionals to help us develop a new generation of systems. The basic hardware/software configuration is IBM 370/138, DOS/VS, POWER, CICS, DL/I, VSAM, SPM II, Assembler and COBOL. Our management approach is people-oriented with a strong emphasis on planning for continued growth in a wide range of medical and financial applications. Successful candidates for these programming positions will perform a complete scope of program development activities including logic design, instruction coding, documentation, program testing and user education.

We will select individuals based on employment background, work experience and education. Minimum qualifications include an Associates degree and 2 years experience. Contact:

W.M. Jones

Harper·Grace Hospitals

Human Resources Department
3990 John R.
Detroit, MI 48201
(313) 494-8082

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SOFTWARE PROFESSIONALS

Immediate openings exist at our St. Louis headquarters for qualified Software Personnel.

Qualified candidates should have experience in SYSGENS, PTF application, problem determination, and assembler language coding.

Currently we are using the SVS operating system with future plans to move to MVS, on IBM 370's Model 158 and Model 145 with HASP shared spool. A BS degree is required and experience with MVS and CICS/VS is a definite plus.

We offer an excellent salary, comprehensive benefits and opportunity for advancement. Please send resume and salary history in confidence to:

Anheuser-Busch, Inc.

Manager, Salaried Employment
Department G-5
721 Pestalozzi
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DATA PROCESSING MANAGER

Previous management experience in a Systems and Programming environment preferably with a bank. This individual will have the responsibility of organizing, planning and laying the foundation for a new DP center in Georgia. IBM DOS VS background required. 30K+.

All inquiries held in the strictest of confidence.

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Positions require a minimum of 2 years experience as a Programmer/Analyst on IBM 360/370 OS environment using ANS COBOL. Candidates must have the ability to program a wide variety of business applications. TSO experience desired. (Section 205).

CICS Applications Programmer

We seek a CICS Applications Programmer for development of 700 terminal customer information system. Heavy in Assembler, COBOL, MVS, TSO, VSAM. 4-5 years experience required (Section 206).

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Position requires a minimum of 1 year current experience as a CICS Programmer with additional years of experience preferred. Successful candidate will take on major responsibilities in the design and development of a large on-line Customer Inquiry System of approximately 800 CRT terminals. Experience in VTAM, NCP, TCAM, EP and TSO is desirable. (Seciton 207).

Systems Analyst

Position requires experience in design of large scale application systems, extensive user interface, experience in data base design and minimum of 3-5 years experience as an analyst. Good communication skills essential. College degree and long-range planning experience are desirable (Section 208)

Expect a comprehensive benefits package and salary commensurate with your experience and ability. For consideration, please submit your resume and salary history to Professional Recruitment (please indicate Section Number), P.O. Box 800, Rosemead, California 91770

Southern California Edison

We aggressively support Equal Opportunity & Affirmative Action.

SCE

SYSTEMS PROGRAMMER

Major computer mfr. has a ground floor opportunity for personable tech. Must have strong communication skills + min. 4 years systems software exp. w/VM & internals. $21-$28,000 (Fee Paid). Contact Jim Staunton (in confidence).

ROBERT HALF PERSONNEL AGENCIES
140 Federal St.
Boston, Mass. 02210
(617) 423-6440

PROGRAMMER-SYSTEM ANALYST

B.S. in Computer Science or equivalent experience required. 3 years experience preferred. Familiarity with the Univac computer system, using telecommunications. Must be knowledgeable with COBOL and RPGII computer language. Police systems preferred. Salary negotiable. Send resume to Personnel Office, Civic Center Complex, Greeley, Colorado 80631. An Equal Opportunity Employer.

ANALYSTS

PROGRAMMERS

We are hiring for several positions in our Development Dept. to take on many new projects in our long range plan. Our diverse international business interests are growing rapidly and need good development teams.

As a professional at any level of experience, we can support your personal growth through in-house training; work in CICS, TSO, Mark IV, COBOL, PL/1, MVS, and data base.

If you are looking for an exciting career in fast moving applications development then we're the people to join.

Call or write Mr. B.M. Robinson to arrange weekday, evening or Saturday interviews. (214) 670-2284, Out of Dallas (in Texas) call toll free (800) 492-6715.

LONE STAR GAS COMPANY

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COMPUTER PROGRAMMER

A progressive mid-south utility company needs computer programmer. Individual must have one-and-one-half to five years experience in Cobol and DOS/VS.

Send resume and salary requirements to:

Personnel Manager
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MANUFACTURING SYSTEMS ANALYST

World's leading manufacturer of automotive batteries is seeking an experienced systems analyst to work in division offices.

The job involves the analysis of manufacturing disciplines to assess information requirements and then translate those requirements into optimum systems designs. Detailed specs will be developed from which programs can be written.

Candidate should have 1-2 years of COBOL programming plus 1 year of systems analysis of manufacturing operations. User contact, good verbal and written communications skills and project achievement are important requirements. A bachelor's degree in computer science or math or the equivalent experience is desired.

Excellent salary and fringes. Call or write:

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Holiday Inn

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To develop a comprehensive Reservation Information System. Qualifications to include experience in one or more of the following areas:

- Information Systems Development
- 3-4 years VS COBOL
- Data Base Design

Applied business statistics experience highly desirable for one of the available positions.

MANAGERS PROJECT LEADERS SENIOR PROGRAMMERS

To develop an on-line reservation system. Qualifications to include experience in one or the following areas:

- 3-4 years on-line application development-ACP environment preferred.
- 4-6 years operating system software experience. ACP, VM, VS preferred.
- Communication network and software development.

Reservation system background preferred.

Enlargement of our staffing in response to need makes these openings attractive for career progress. Will relocate to Memphis, a progressive, colorful city affording excellent living and many advantages. Call collect or send resume with salary indicated, in confidence to:

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We're putting more bytes to work in a real time environment than anyone else in the industry. For almost 2 decades, we've bred a family of pacesetting systems, culminating in the first true 32-bit super mini — not a bridge-the-gap system from 16 bit architecture, but a true 32-bit machine with richer instruction sets and larger directly addressable memory.

This kind of presence means opportunity is here now along with the resources to really make a name for yourself. If being on the cutting edge of technology, surrounded by year round warmth and swaying palms sounds inviting, consider the many ways available for you to grow at Systems Engineering.

We welcome the professional who is highly motivated in the direction of creativity, fresh conceptualization, and imaginative problem-solving in state-of-the-art design and software development of small to medium real time systems.

CONTRACT ADMINISTRATOR

Senior Level, With Program Management Capability. We require experience, ability and effectiveness at all levels of management in negotiating, drafting, enforcing, and administering fixed-price government and industrial contracts and knowledge of ASPR, and computer systems. Background is essential in either legal, business, or engineering areas. Some travel.

PROJECT ENGINEERS BSEE

and experience with job costing of customer computer systems.

PROJECT LEADER BSEE

and minimum of four years experience as Group Leader involved in job costing for custom computer systems.

MICROPROGRAMMER

Minimum of one year design experience in FIRMWARE design. Work involves state-of-the-art advanced concepts.

SENIOR ENGINEERS (DIGITAL)

Four years experience in LOGIC DESIGN. Microprocessor or CPU experience highly desirable. Work involves Custom Systems Group.

SOFTWARE TECHNICAL INSTRUCTOR

Two or more years teaching computer software courses in industry or academia. Must have knowledge of ASSEMBLY and FORTRAN language.

MTS PROGRAMMER (DISTRIBUTIVE SYSTEMS)

Must have thorough knowledge of Assembly language programming and some background in FORTRAN. Real Time and Inter-CPU COMMUNICATIONS and Data Base experience preferred.

MTS PROGRAMMER (DATA BASE DESIGN)

D/B Generation software experience for data acquisition and applications programs. Assemblers and FORTRAN required.

MTS PROGRAMMER (CUSTOMER SERVICE)

Minimum of three years in ASSEMBLY and FORTRAN LANGUAGE. Programming background in Real-time and applications environments. Customer contact experience desired. Some travel.

TECHNICIANS DIGITAL

I/O and CPU experience desirable. Will work closely with digital design engineers. Two years experience in troubleshooting and testing preferred.

DESIGNER

Three to ten years experience in electromechanical design for a computer manufacturer.

SYSTEMS offers top starting salaries, relocation to beautiful Fort Lauderdale, a full-range benefits program including dental insurance, savings/retirement plan and 100% tuition refund, and the opportunity to work and advance your career in a stable and stimulating professional environment. For immediate and confidential consideration, please forward resume or detailed letter of information, including current annual compensation to: MR. FRED BRILLANTE, Dept. CW26.

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6901 West Sunrise Blvd., Fort Lauderdale, Florida 33313
Equal Opportunity Employer Male/Female

GAMES DESIGNER MINI SYSTEMS $25,000-$30,000

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Executive Recruiters
Bruce A. Montville
P.O. Box 623
Computer Park
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(603) 926-6712

PROGRAMMER ANALYST

A progeressive mid-south utility company needs a programmer analyst. Individual must have three to five years programming experience, two years Cobol programming DOS/VS background. JCL proficiency.

Send resume and salary requirements to:

Personnel Manager
P.O. Box 2177
Little Rock, AR 72203
An Equal Opportunity Employer M/F

MIAMI-DADE COMMUNITY COLLEGE

Job opening for experienced PROGRAMMER ANALYST, working with advanced student information systems for a large multi-campus institution. Minimum of three years' applicable experience, OS COBOL, required; IBM Assembler a plus. Salary range: $13,703-$18,706, plus liberal employee benefits.

Submit resume to:
Personnel Services
Miami-Dade Community College
11011 S.W. 104 Street
Miami, Florida 33176
An Equal Access/Equal Opportunity Community College

PROGRAMMERS AND ANALYSTS

If you are a programmer, programmer/analyst or systems analyst and would like the most individualized job search offered in the data processing field today, either on a local or national level, send your resume in confidence to either location:

CINCINNATI
SEARCH E.D.P., INC.
3181 LINWOOD AVE
SUITE 25
CINCINNATI, OHIO 45208

DALLAS
SEARCH E.D.P., INC.
13773 N. CENTRAL EXPWY
SUITE 1305
DALLAS, TEXAS 75243

Western Gear Corporation

A major Southern California manufacturer of precision aircraft oriented products has immediate openings for:

SYSTEMS ANALYST

Responsibilities will include developing and implementing scientific programs in support of engineering analysis; control of test equipment and data retrieval. Recent experience in minicomputers desirable.

PROGRAMMER ANALYST

Will perform FORTRAN and assembly language programming on a minicomputer system to perform real-time data acquisition, data analysis and control of a gear box test stand.

Interested qualified candidates please submit resume or apply to Industrial Relations Department.

Western Gear Corporation
APPLIED TECHNOLOGY DIVISION
14724 E. Proctor — City of Industry, CA. 91744
Equal opportunity employer M/F/H

COMPUTER SCIENCE CAREER/GROWTH OPPORTUNITY

CORPORATE HEADQUARTERS STAFF

SYSTEMS DEVELOPMENT
ANALYSTS AND ENGINEERS

QUALIFICATIONS:
* Bachelors or masters degree in computer science engineering, mathematics, physics, accounting or business.
* Two or more years experience developing computer based systems
* Ability to identify business problems and develop solutions through use of on-line, distributed, or batch processing systems.

RESPONSIBILITIES:
* Development of marketing, manufacturing, logistics, engineering, accounting and administrative systems for a major worldwide corporation consisting of a petroleum company, chemical company, coal company and construction company. Development includes feasibility studies, analysis design programming, testing and installation of systems on hardware, configurations ranging from minis to 370/168.

SYSTEMS PROGRAMMERS

QUALIFICATIONS:
* 1 year recent BTAM/TCAM experience required. Commercial programming and PL1 or on-line INTERCOM/IMS/CICS desirable.
* BS degree in math or computer science essential.

RESPONSIBILITIES:
* Perform systems programming duties in support of OS/VS2 and IMS/VS/DB/DC systems.
* Systems generation, maintenance assurance testing; tuning including assist and development and implementation of teleprocessing networks.
* Design and develop administrative and management reporting dealing with the teleprocessing systems.

These positions are available in our corporate headquarters in Ashland, KY. Excellent compensation program including: attractive salary and extensive benefits. For immediate consideration please send resume and salary history in confidence to:

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Dept. K
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No phone calls please

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Capitalize on your professional knowledge and experience in engineering in order to advance your career prospects with Hewlett-Packard's Avondale Division, located 30 miles from center city Philadelphia. We presently seek highly creative and talented individuals to staff these openings:

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Individuals will participate in the design and development of hardware/software systems for analytical laboratories. A background in real time systems design is desirable. A Degree in Computer Science or the equivalent and a minimum of 2 years experience is preferred.

Electrical Engineers

As a Design Engineer, you will participate in the product development of microprocessor-based analytical instruments. This position requires experience in digital design with knowledge of analog circuits. An advanced degree in EE or equivalent and a minimum of 2 years experience is preferred.

These positions offer attractive salaries, comprehensive benefits and paid relocation expenses. Let your hard won skills lead to career success and satisfaction. Send your resume in confidence to: Ms. D. Engel

HEWLETT hp PACKARD
Avondale Division Rt.41, Avondale, Pa.19311

An Equal Opportunity Employer M/F

SYSTEMS AND PROGRAMMING

The Trane Company, a leading manufacturer of air conditioning and heating equipment is seeking candidates for openings in the following areas at their Clarksville, Tennessee manufacturing location.

SYSTEMS ANALYST

Will perform analysis work on projects in all areas of material management including forecasting, inventory control, distribution and purchasing. Candidates should have a B.S. degree in a related field and at least 1 year of analysis experience. On-line inventory and purchasing systems experience would be a definite plus.

PROGRAMMER ANALYST(S)

Responsible for the design, coding and testing of programs including systems testing, user training, and preparation of final documentation. Candidates should possess a good working knowledge of ANS, COBOL, and CICS. BAL, DL/I, VSAM and OS/VS1 experience is definitely a plus.

We are a 3 MEG 370/158 shop running under DOS/VS. Present plans include migrating to a VS1 environment this year. Our environment also includes a local and remote TP network of about 40 video terminals. Interested applicants should send resume including salary history to:

TRANE AIR CONDITIONING

THE TRANE COMPANY
P.O. Box 1008
Clarksville, Tenn. 37040
Attn: Jim Coleman

An Equal Opportunity Affirmative Action Employer M/F

SYSTEMS SOFTWARE DEVELOPMENT

$15-35,000

The successful development of large scale, interactive minicomputer systems by this company has led to the doubling of their sales in the last year alone.

In order to continue this record, computer scientists at all levels of experience are needed to create software in the following areas:

- COMMUNICATIONS
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- TIME SHARED OPERATING SYSTEMS
- DATABASE MANAGEMENT

Please call Ted Chaloner at (617) 426-4180 or submit resume with salary requirements to:

ROGERS & SANDS
100 Federal Street, Boston, MA 02110

Member of Massachusetts Professional Placement Consultants

Software Quality Control Engineers

Five to seven years experience required in application of military standards to software quality control, especially MIL-S-52779. A background in the writing of software test plans/procedures and verification of hardware/software compatibility is also necessary. BS in computer science, engineering or math required.

You will participate in an excellent benefits program that includes, but is not limited to, a company-paid, ten-part insurance plan, two pension plans (one company-paid), personal investment plan, stock purchase plan and a 100% tuition refund program.

Please send resume, stating present salary to:

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Westinghouse
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Baltimore, MD 21203
Equal Opportunity Employer

Westinghouse

BANKING SYSTEMS PROJECT LEADER

Florida Opening with Major Bank Group Requiring MICR/Transit/Item Processing Background

Enjoy a solid, challenging career with a DP Center serving more than 50 bank offices, in a growth situation, with the stability of an organization that now has over $1.6-billion in assets. Enjoy, too, the advantages of Florida living in an area offering metropolitan resources.

Requirements include strong MICR/Transit/Item Processing experience, at least 4 years of IBM assembler language and 2 or 1419 Denny Fast Transit System, plus bulk filing implementation; recent exposure to IBM 370/145 DOS/VS; and working knowledge of proof of deposit systems and proof functions. Ability to work and communicate well with bank operations management will be important.

This is a favorable advancement opportunity. Please send resume, indicating salary record, in confidence to Mr. Jim Madden,

FLAGSHIP SERVICES CORPORATION
Data Processing Division of
FLAGSHIP BANKS, INC.
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SYSTEMS PROGRAMMER

We have a challenging position available in this major university medical center. Hardware is an IBM 370/158 with upgrade to an AP planned, and several PDP11s doing distributed processing with communications links to the 370. Currently a VS1 shop and beginning conversion to MVS. We are dedicated to continuing development and support of an on-line hospital information system, and are using state-of-the-art software and hardware to achieve that purpose. The person we are looking for will have three to five years systems programming experience, including two years VS1 and/or one year MVS. Experience with CICS DL/1 would be a plus. Competitive salary and fringe benefits plus the cultural, recreational, and educational advantages of a university community. Send resume to A.J. Aniello, Systems Development, University of Iowa Hospital and Clinics, Iowa City, Iowa 52242. Phone: (319) 356-2432.
Equal Opportunity Employer

MANAGEMENT CONSULTING

Growth of our professional management services has created the need for additional consultants in the area of telecommunications. Send resumes in confidence to:
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2021 Spring Road
Oak Brook, Ill. 60521
Attn: M.A. Franke
Qualifications include experience; Bachelor degree, Masters preferred. Responsibilities to include voice and data telecommunications, network analysis and configuration, telecommunication planning and controls, etc.
Benton, Schneider & Associates Incorporated

SYSTEMS PROGRAMMERS

VM/370

BS Degree in Computer Sciene or equivalent. Minimum 3 to 7 years experience. Must have experience in CP or CMS Internals.

Positions offer attractive salaries and fully paid benefits package.

TO ARRANGE AN APPOINTMENT:
If you qualify please forward a copy of your resume to:

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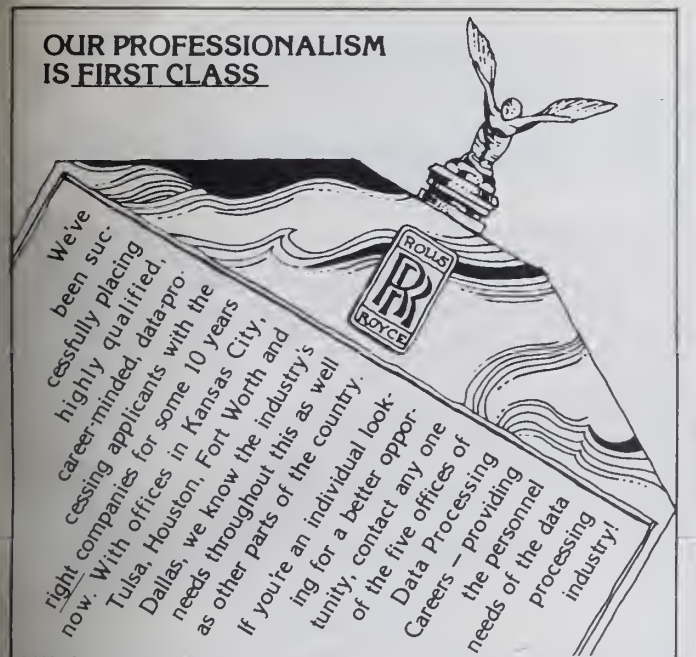

We've been successfully placing highly qualified, career-minded, data-processing applicants with the right companies with the now. With offices in Kansas City, Tulsa, Houston, Fort Worth and Dallas, we know the industry's needs throughout this as well as other parts of the country. If you're an individual looking for a better opportunity, contact any one of the five offices of Data Processing Careers – providing the personnel needs of the data processing industry!

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Suite 1109	Suite 911	Suite 960E	Suite 502	Suite 10
Stemmons Tower West	One Summit Avenue	4615 Southwest Frwy	6405 Metcalf	Park 21 Building
Dallas, TX 75207	Ft. Worth, TX 76102	Houston, TX 77027	Shawnee Mission	2626 East 21st St
(214)637-6360	(817)336-4565	(713)960-9102	Kansas 66202	Tulsa, OK 74114
			(913)236-8288	(918)747-3621

DATA PROCESSING CAREERS

SYSTEMS and DATA PROCESSING PROFESSIONALS

As a significant leader in our industry and as a $100 million plus NYSE-listed corporation, we have an immediate need to substantially increase our current systems and data processing staff. Our current and future corporate committed projects require a number of professionals with varied business applications knowledge and experience. Our present hardware configuration centers on an IBM 370/145 using DOS, VS, TOTAL data base with COBOL and BAL. A number of current on-line and batch systems will be enhanced with the addition of several significant and new to the industry on-line systems. Our plan includes systems development using mini-computers and distributed data processing systems. We need people in the following areas:

SYSTEMS ANALYSTS

2 or more years experience in the design, development, and implementation of computer based systems and business applications. Experience in dealing with users staff personnel at all levels.

SYSTEMS PROGRAMMER

Experience in entering and maintaining a VS operating systems in a data base communications environment. Other areas include POWER, job accounting, and certain on-line applications programs. Requires some previous experience in systems programming and software.

PROGRAMMER ANALYSTS

2 or more years experience in COBOL/BAL. You will be involved in a variety of application systems such as: manufacturing, retailing, financial, accounting, marketing and inventory. On-line order entry, distribution, payroll and inventory are just a few of the planned systems.

MANUAL SYSTEMS ANALYST

At least 2 years experience in systems and procedures with exposure to work measurement/work simplification techniques. Experience in form and reports control & managmeent, business & systems procedures and user & vendor contact desired. An industrial engineering background or exposure is highly desirable.

COMPUTER OPERATORS

At least 2 years experience with an IBM 360/370 using DOS/VS. 2nd and 3rd shift positions available.

We are a rapidly growing organization with full management support in the development and application of new systems to increase and improve our business position. We offer the opportunity for professional growth, coupled with excellent salaries and benefits. For more information send a complete work and salary history or call:

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PERSONNEL DEPARTMENT

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Move where these jobs are located! Our clients seek qualified EDP prof's due to expansion. All positions are in the "Sunbelt". Excellent benefits including in-house career progression and state-of-the-art installations. All fees, costs, and temporary living expenses paid by the companies.

24 Systems Programmers	$20-26K
7 COMTEN's Specl (S/W experience)	$16-24K
6 Sys. Anal. (Ex. BIG 8 EDP Cons.)	$20-26K
25 Project Lead. IMS/VS COBOL	$20-25K
60 Prog/Anal (S); Progs	$14-24K

Contact Bill Denny, V.P.

CALL TOLL FREE 24 HRS./DAY
1-800-821-2270 EXT. 605
(In. Mo 1-800-892-7655)

Jim King and Associates
438 Gulf Life Tower Jacksonville Florida 32207
(904) 398 7371

SENIOR COST ACCOUNTANT

Excellent Santa Barbara opportunity for a self-motivated person looking for a challenging career growth opportunity. Requirements include a BS degree plus 3-5 years general or cost accounting experience in job cost systems. Background in the computer manufacturing or peripheral industry is preferred.

AMC is a leading producer of magnetic recording devices for the computer industry, and offers an excellent salary and fringe benefits including:

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Clients offer rewarding career benefits, challenging enviornment for advancement & are ready to interview immediately.

D.P. Mgr - Sys 3-15, 5+ yrs, responsible for all DP areas To $25,000

Sys Engr-Liaision Mini Mfg (User; 2+ yrs; know O/S; Compilers To $24,000

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Software Support-"Team Player"-Support OS/VS Shops - 3+ yrs Assembler; DB/DC mid $20's

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Programmers - "thinkers-not coders" - COBOL/OS $13-20,000

Client cos pay all employment expenses. For more info contact in conf, Ron Spang, (404) 393-0933, or send resume to

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Our Atlanta, Detroit and Philadelphia branches are seeking individuals with a minimum of 3 years experience in either COBOL or PL/1. Knowledge of FORTRAN, ALC, IMS, DMS, TOTAL or CICS is a plus.

We offer an excellent salary and benefit program including fully paid medical insurance. Relocation allowances for those who qualify. Please state location preference.

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3000 Town Center, Suite 1030
Southfield, Michigan 48075
(313) 353-7230
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AiC

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- **Project Mgrs** Low $30's
  Due to unprecedented demands for their service this prestigious New England Service Firm seeks (3) Project Mgrs. Must have heavy on-line, real-time exp. Mini exp very big +.
- **Internal Consultant** $30,000
  Major NY Bank has position open for high powered technician (OS/VS/COBOL/BAL, on line exp, etc.) to provide application development technical expertise to systems devel groups.
- **Mgmt. Consultants** Low $30's
  Aggressive, rapidly growing office of a major Management Consulting firm seeks (4) career oriented systems analysts. Must have excel conceptual, problem solving skills & be interested in a fast track oppty.
- **Programmer Analysts** $25,000
  Well-known Financial firm is experiencing extensive growth in their systems development dept. Multiple openings exist for 370/OS/VS COBOL & BAL Progs & Prog Analysts.
- **Sys. Analysts** $26,000
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Our Client, a Fortune 500 worldwide leader in the consumer market, has expanded its Data Processing Department to include ten new professionals ranging from entry level computer science graduates to ten years experience.

Our Client is conveniently located in the foothills of the Adirondack Mountains, just minutes away from the Albany/Schenectady Capital District of New York State.

If you are a computer professional with the following qualifications, please rush your resume to us for immediate attention:

5 Entry Level DP Positions BS and/or MBA desirable	to $18,000
2 System/Analysts, **3-5 years experience** General Business Systems Degree	to $25,000
Senior Programmer, 5 years experience promotable to Lead Programmer	to $20,000
System/Programmers, software techniques 370/OS MVT	to $25,000
Programmer, 2-3 years business applications experience with large equipment	to $18,000

CAREER ADVISORS
125 Wolf Road-Albany, N.Y. 12203
(518) 458-1810

Our client companies assume all fees.

Programming

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Research and Implement data base. Gear up for VM/370 CMS. Update and maintain existing systems. Requirements: 6 yrs experience in programming and systems, 2 of which should be in software, CICS/VS, POWER/VS, college background. "Tell us what you've done."

PROGRAMMER

On-line systems in registration, general ledger, personnel. Take part in educational system development. Requirements: 2 yrs experience in COBOL, and college. CICS/VS, coding and BAL a definite plus.

Benefits: 21-27 vacation days, 3 personal days, education, life insurance, medical and dental plans, plus more if you qualify.

Environment: Educational with student and administrative services supported on 370/138 DOS/VS system with RJE under POWER/VS. This is a rapidly expanding TP shop using CICS/VS software and microwave transmission facilities.

Contact: Harold Blades
Computer Center Director

ESSEX COUNTY COLLEGE
303 University Ave.
Newark, N.J. 07102
(201) 877-3440

Affirmative Action & Equal Opportunity Employer

SYSTEMS PROGRAMMER

A southwestern Minnesota company is accepting applications for Systems Programmer, to locate in central Kansas. Applicants should be familiar with Honeywell level 66/05. Utilizing time sharing with GECOS operating system. Applicant will be developing a distributed processing system, mainly in manufacturing operations. MRP experience preferred.

Excellent starting salary and benefits are offered. If qualified, please send resume to:

Schawn's Sales Enterprises, Inc.
115 West College Dr
Marshall, MN 56258

Mobil

IMS
TASK LEADERS
SR. PROGRAMMER/ANALYSTS
for DALLAS, TEXAS

Planned growth in our information systems activities requires some permanent additions to our systems development staff. The initial assignments will be with a project team in New York, designing the applications systems and special security software for a modern, on-line Human Resources Information System (HURIS) using IMS.

Upon completion of the business systems and computer systems design for HURIS — early 1979, the team will be relocated to Dallas, Texas for program development and systems implementation. Subsequent assignments, which would be in Dallas, would involve either major extensions to HURIS or senior-level participation in other major business information systems now being planned in other Mobil units.

Since these are long-term career positions, we are seeking people with project leadership potential, demonstrated IMS experience and a college degree.

Please send resume indicating experience, educational accomplishments and salary history to: Mr. P.J. Harbaugh, Jr., Manager, Professional Recruitment and Placement, Dept. 4106, MOBIL OIL CORPORATION, 150 East 42nd St., New York, N.Y. 10017.

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COMPUTER SCIENTISTS

Immediate openings for experienced computer software personnel to work in client-oriented, non-profit applied research organization. Positions involve software engineering, computer system evaluation, software support tools, systems software, interactive computing, computer graphics, real-time systems and microprocessor based systems. The successful candidate will have a B.S. or M.S. in engineering or science with considerable experience in computer science. Excellent educational opportunities and benefits. Salary will depend upon experience and qualifications. U.S. citizens eligible for DOD clearance only. Please send resume and references to: Code EWM/Computer Scient & Technology Division, Engineering Experiment Station, Georgia Institute of Technology, Atlanta, Georgia 30332, (404) 894-3417. An Equal Opportunity Employer.

COMPUTER PROGFESSIONALS
370 MVS/JES 3, Large TSO & TCAM/CICS
Network Environment

Pennsylvania Power & Light Company, a progressive electric utility headquartered in thriving Central Eastern Pennsylvania, offers immediate openings on its EDP Staff. You will be working and growing in a stimulating, highly professional environment with a company that recognizes and rewards good work. Salary fully commensurate with experience, outstanding benefits package, highly desirable location.

SYSTEMS PROGRAMMERS

Background should include a degree in Business, Mathematics, Computer Science (or equivalent in experience) plus actual systems generation and implementation experience on MVT and/or MVS operating systems. Knowledge of TCAM, CICS, or PL/1 helpful. ASP or JES 3 background preferred, but not required.

TP NETWORK COORDINATOR

Background should include a degree in Business, Mathematics, Computer Science (or equivalent in experience) plus actual TP Network experience including equipment evaluation, troubleshooting and operations interfacing. Duties will include the maintenance of a highly sophisticated TCAM message control program. CICS and PL/1 experience helpful but not required. TCAM/Assembler background preferred.

For prompt consideration, write in confidence to:
Bob Chiodi, Dept. NYT

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PERSONNEL AGENCIES
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(215) 568-4580

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(COBOL)
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"Christian Organization has openings for Programmers and Programmer Analyst." "Should have minimum of 2 to 5 years experience, preferably in COBOL, VSAM, CICS and a working knowledge of IBM 370/135, DOS/VS." "Please send resumes to Personnel Manager, General Council of Assemblies of God, 1445 Boonville, Springfield, Missouri 65802."

A tenure track faculty appointment of the assistant professor level is available September 1, 1978 in Computer Science at Montana State University. Duties include instruction at the undergraduate level, student counseling and research activities. A Ph.D. in Computer Science is required with an undergraduate degree in Engineering desirable. Candidates with interest and experience in operating systems, automata and languages will be given preference. Send resumes prior to April 1, 1978 to:

Gary Harkin
Department of Computer Science
Montana State University
Bozeman, MT 59717
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EDP Professionals

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PROGRAMMER/ANALYSTS

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esumes should be forwarded to Ms. Whitney Moore, Box 683, Hanover, New Hampshire 03755.

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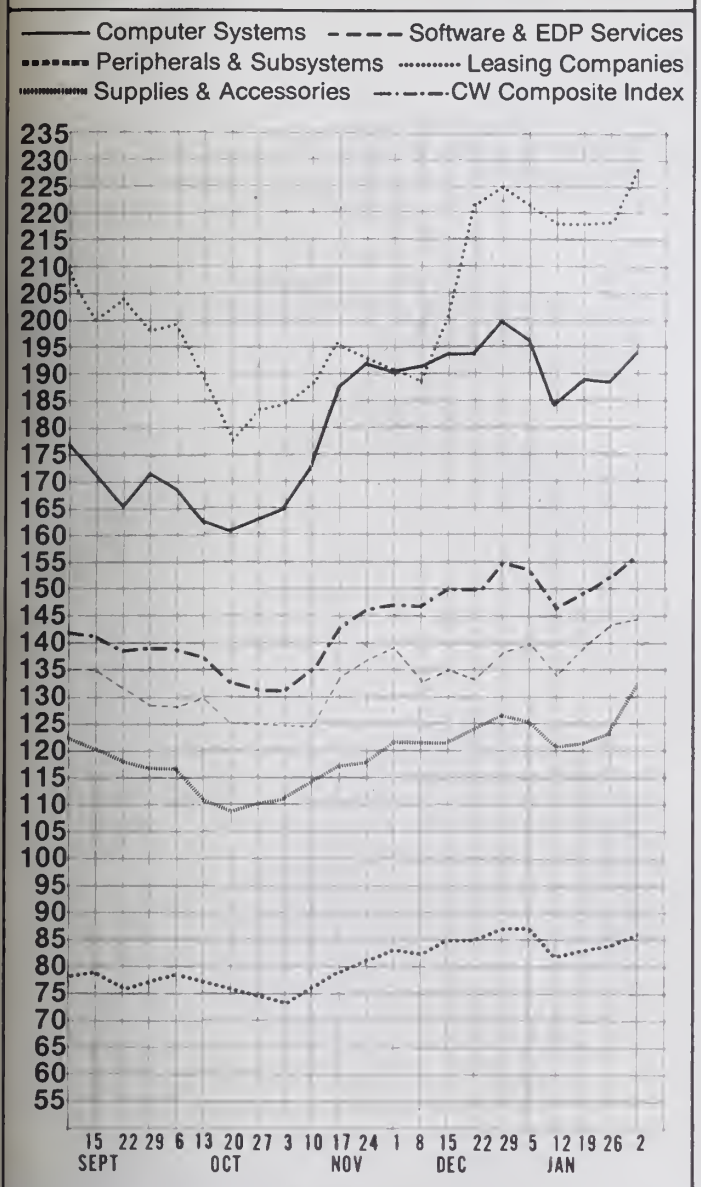

Earnings Reports

HARRIS
Three Months Ended Dec. 31

	1977	1976
Shr Ernd	$.93	$.74
Revenue	215,187,000	150,739,000
Earnings	11,918,000	9,453,000
6 Mo Shr	1.82	1.34
Revenue	401,760,000	277,509,000
Earnings	23,230,000	17,047,000

AUTOMATIC DATA PROCESSING
Three Months Ended Dec. 31

	1977	a1976
Shr Ernd	$.45	$.39
Revenue	72,758,000	60,484,000
Earnings	6,704,000	5,748,000
6 Mo Shr	.83	.72
Revenue	140,278,000	116,877,000
Earnings	12,310,000	10,603,000

a-Restated

COMPUTER SCIENCES
Three Months Ended Dec. 30

	1977	1976
Shr Ernd	$.26	$.26
Revenue	69,765,000	58,093,000
Tax Cred	. . .	750,000
Earnings	3,458,000	3,809,000
9 Mo Shr	.72	.75
Revenue	199,447,000	171,577,000
Tax Cred	. . .	2,250,000
Earnings	10,029,000	10,765,000

DIGI-LOG
Three Months Ended Dec. 31

	1977	1976
Shr Ernd	$.34	$.05
Revenue	1,329,581	647,595
Tax Cred	106,638	6,130
Earnings	240,288	30,137

MCI COMMUNICATIONS
Three Months Ended Dec. 31

	1977	a1976
Shr Ernd	$.12	$.05
Revenue	18,902,000	16,806,000
Tax Cred	1,373,000	. . . . .
Earnings	2,673,000	1,361,000
9 Mo Shr	.20	. .
Revenue	54,511,000	45,489,000
Tax Cred	2,322,000	.
Spec Cred	.	b2,015,000
Earnings	4,533,000	(170,000)

a-Restated for an accounting change. b-Gain on acquisition of subsidiary's debentures.

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Roy Einreinhofer
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Terry Williams
COMPUTERWORLD
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Newton, Mass. 02160
Phone: (617) 965-5800
Telex: USA-92-2529

Boston
Robert Ziegel
Northern Regional Manager
Mike Burman
Account Manager
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800

New York
Donald E. Fagan
Eastern Regional Manager
Frank Gallo
Account Manager
COMPUTERWORLD
2125 Center Avenue
Fort Lee, N.J. 07024
Phone: (201) 461-2575

San Francisco
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Donna Dezelan
Account Coordinator
COMPUTERWORLD
1212 Hearst Building
San Francisco, Calif. 94103
Phone: (415) 495-0990

Los Angeles
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Judy Milford
Account Coordinator
COMPUTERWORLD
1434 Westwood Boulevard
Los Angeles, Calif. 90024
Phone: (213) 475-8486

Japan
Mr. Shigema Takahashi
General Manager
DEMPA/COMPUTERWORLD
1-11-15 Higashi Gotanda
Shinagawa-ku, Tokyo 141
Japan
Phone: (03) 445-6101
Telex: J2424461

United Kingdom
Tony Vickers
IDG PUBLISHING LTD.
140-146 Camden Street
London NW1 9PF
England
Phone: (01) 267-1201
Telex: UK-264737

West Germany
Hans-Jurgen Ballnath
COMPUTERWORLD GmbH
8000 Munich 40
Tristanstrasse 11
West Germany
Phone: (089) 36-40-36
Telex: W.Ger-5-215250-HKFD

TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, FEBRUARY 1, 1978

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

E X C H		1977-78 RANGE (1)	CLOSE FEB 1 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	22- 55	49 1/4	- 1/2	-1.0
N	BURROUGHS CORP	55- 91	66 1/4	+1	+1.5
O	COMPUTER AUTOMATION	18- 30	23 1/2	- 1/2	-2.0
N	CONTROL DATA CORP	20- 29	26	+ 3/8	+1.4
O	CRAY RESEARCH INC	15- 31	30 1/2	+2 1/2	+8.9
N	DATA GENERAL CORP	35- 54	46 1/2	-1	-2.1
N	DATAPOINT CORP	18- 41	39 1/8	+4	+11.3
N	DIGITAL EQUIPMENT	37- 53	41 5/8	- 7/8	-2.0
N	ELECTRONIC ASSOC.	2- 3	2 1/4	0	0.0
A	ELECTRONIC ENGINEER.	8- 16	14	- 3/8	-2.6
O	FOUR-PHASE SYSTEMS	13- 23	22 1/2	+1 1/4	+5.8
N	FOXBORO	28- 54	30 1/4	- 3/8	-1.2
O	GENERAL AUTOMATION	6- 9	7	+ 1/4	+3.7
O	GRI COMPUTER CORP	1- 1	7/8	+ 1/4	+40.0
N	HEWLETT-PACKARD CO	66- 87	66 3/8	-1 5/8	-2.3
N	HONEYWELL INC	43- 55	44 5/8	+ 3/4	+1.7
N	IBM	245-286	265 1/2	- 3/8	-0.1
O	MANAGEMENT ASSIST	5- 11	11	+1 5/8	+17.3
O	MICRODATA CORP	7- 18	11	+ 1/4	+2.3
O	MINI-COMPUTER SYST	5- 12	5 1/4	0	0.0
C	MODULAR COMPUTER SYS	5- 9	8 7/8	+ 5/8	+7.5
N	NCR	32- 47	41 1/8	+ 5/8	+1.5
O	PRIME COMPUTER INC	12- 25	24 1/2	+1 3/8	+5.9
N	PERKIN-ELMER	17- 22	18 3/8	- 3/8	-2.0
N	RAYTHEON CO	16- 35	30 7/8	+ 1/4	+0.8
N	SPERRY RAND	30- 42	34	- 1/8	-0.3
O	SYCOR INC	8- 21	20 1/2	0	0.0
A	SYSTEMS ENG. LABS	5- 13	11 3/4	- 5/8	-5.0
A	WANG LABS.	10- 14	12 1/2	0	0.0

LEASING COMPANIES

O	ALANTHUS CORP	3- 6	5 5/8	0	0.0
C	BOOTHE COURIER CORP	8- 14	15 1/4	+2	+15.0
O	COMDISCO INC	10- 16	15 1/4	+ 1/2	+3.3
A	COMMERCE GROUP CORP	1- 3	3/4	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	3/4	-	-7.0
M	DATRONIC RENTAL	0- 2	1 3/8	+ 1/8	+10.0
A	DCL INC	1- 3	3	+ 1/8	+4.3
N	DPF INC	6- 10	9 1/8	+1 1/8	+14.0
N	ITEL	13- 22	17 3/8	0	0.0
N	LEASCO CORP	19- 27	25 1/4	+ 3/4	+3.0
O	LEASPAC CORP	1- 2	1 1/2	+ 1/8	+9.0
A	PIONEER TEX CORP	5- 11	5 3/4	+ 1/8	+2.2
N	U.S. LEASING	10- 16	13	+ 1/2	+4.0

SOFTWARE & EDP SERVICES

O	ADVANCED COMP TECH	0- 2	1 3/4	+ 1/8	+7.6
C	ANACOMP INC	7- 10	8 5/8	+ 1/8	+1.4
A	APPLIED DATA RES.	5- 10	8 3/4	+ 1/4	+2.9
N	AUTOMATIC DATA PROC	23- 30	26 1/2	- 1/8	-0.4
O	COLEMAN AMERICAN COS	2- 2	1 3/4	0	0.0
O	COMPU-SERV NETWORK	9- 15	10	- 1/4	-2.4
C	COMP ELECTION SYSTMS	6- 10	9 1/4	0	0.0
O	COMPUTER HORIZONS	1- 1	1 1/2	0	0.0
C	COMPUTER NETWORK	6- 11	8 1/2	- 1/4	-2.8
N	COMPUTER SCIENCES	7- 10	8 1/2	- 1/4	-2.8
O	COMPUTER TASK GROUP	1- 2	1 7/8	+ 3/8	+25.0
C	COMPUTER USAGE	1- 3	1 5/8	0	0.0
O	COMSHARE	5- 8	7 1/2	0	0.0
C	DATA DIMENSIONS INC	3- 5	4 3/4	+ 1/4	+5.5
O	DATATAB	1- 2	1 1/4	- 1/8	-9.0
N	ELECTRONIC DATA SYS.	14- 20	15 5/8	+ 1/2	+3.3
O	INSYTE CORP	2- 3	1 3/8	0	0.0
C	IPS COMPUTER MARKET.	1- 2	2 1/8	0	0.0
O	KEANE ASSOCIATES	3- 4	3 3/8	0	0.0
O	KEYDATA CORP	1- 3	1 3/8	0	0.0
A	LOGICON	7- 17	11 5/8	- 1/2	-4.1
A	MANAGEMENT DATA	1- 2	1 1/8	0	0.0
A	NATIONAL CSS INC	10- 18	17	+ 3/4	+4.6
O	NATIONAL DATA CORP	4- 7	7	0	0.0
A	ON LINE SYSTEMS INC	16- 22	19 1/2	+1 3/8	+7.5
N	PLANNING RESEARCH	3- 6	4 1/8	0	0.0
O	PROGRAMMING & SYS	1- 1	5/8	0	0.0
O	RAPIDATA INC	2- 3	3	0	0.0
O	REYNOLDS & REYNOLD	17- 21	19 1/4	+ 1/4	+1.3
O	SCIENTIFIC COMPUTERS	1- 4	3 7/8	0	0.0
O	TYMSHARE INC	14- 23	21 3/8	+1	+4.9
A	URS SYSTEMS	4- 5	5	0	0.0
N	WYLY CORP	1- 2	5/8	- 1/8	-16.6

PERIPHERALS & SUBSYSTEMS

N	ADDRESSOGRAPH-MULT	10- 16	14 1/2	0	0.0
O	ADVANCED MEMORY SYS	7- 9	8 3/4	+ 1/2	+6.0
N	AMPEX CORP	8- 12	11 7/8	+ 5/8	+5.5
O	ANDERSON JACOBSON	3- 6	5	+ 1/8	+2.5
N	APPLIED DIG DATA SYS	10- 20	13 3/8	-2 1/4	-14.3
O	BEEHIVE INT'L	5- 12	5 5/8	- 5/8	-10.0
A	BOLT,BERANEK & NEW	6- 9	5 3/4	- 1/8	-2.1
N	BUNKER-RAMO	8- 13	11 3/4	- 7/8	-6.9
A	CALCOMP	3- 5	3	+ 1/8	+4.3
O	CAMBRIDGE MEMORIES	1- 4	3	- 1/8	-5.8
N	CENTRONICS DATA COMP	16- 30	18	+ 1/2	+2.8
O	COGNITRONICS	1- 1	7/8	- 1/8	-12.5
O	COMPUTER COMMUN.	5- 8	6 1/4	- 1/8	-1.9
O	COMPUTER CONSOLES	4- 7	4	+ 1/4	+6.6
A	COMPUTER EQUIPMENT	2- 4	4 1/4	+ 1/8	+3.0
O	COMPUTER TRANSCEIVER	1- 1	1 3/8	0	0.0
O	COMTEN	9- 13	11 1/8	+ 3/4	+7.2
N	CONRAC CORP	19- 28	21 1/4	+ 1/8	+0.5

E X C H		1977-78 RANGE (1)	CLOSE FEB 1 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	DATA ACCESS SYSTEMS	4- 5	3 1/4	0	0.0
O	DATA 100	6- 11	9 3/4	+ 1/2	+5.4
A	DATA PRODUCTS CORP	9- 19	16 1/2	+1 1/8	+7.3
O	DATA TECHNOLOGY	3- 4	4 1/8	- 1/8	-2.9
O	DATUM INC	1- 3	2 3/8	+ 3/8	+18.7
O	DECISION DATA COMPUT	2- 3	1 7/8	- 1/8	-6.2
O	DELTA DATA SYSTEMS	1- 1	1/2	0	0.0
A	DOCUMATION INC	6- 12	12	+1	+9.0
O	DATARAM CORP	2- 24	19	+ 1/2	+2.7
N	ELECTRONIC M & M	4- 5	4 1/8	- 3/8	-8.3
O	FABRI-TEK	1- 2	1 1/8	0	0.0
O	GENERAL COMPUTER SYS	0- 2	1 1/4	0	0.0
N	HAZELTINE CORP	8- 12	10	+ 1/8	+1.2
N	HARRIS CORP	28- 47	42	+ 1/4	+0.5
A	INCOTERM CORP	10- 19	17 1/2	0	0.0
O	INFOREX INC	4- 7	6 1/4	+ 1/2	+8.6
O	INFORMATION INTL INC	8- 14	8 3/4	- 1/2	-5.4
O	INTEL CORP	38- 57	44 1/2	+1	+2.2
A	LUNDY ELECTRONICS	3- 6	3 5/8	0	0.0
O	MSI DATA CORP	6- 15	12 1/4	- 1/4	-2.0
O	MEMOREX	23- 34	28 1/4	- 3/4	-2.5
N	MOHAWK DATA SCI	5- 8	6 1/8	+ 3/8	+6.5
O	PENRIL CORP	2- 6	4 7/8	- 3/8	-7.1
N	PERTEC CORP	7- 11	10 1/8	0	0.0
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
C	PRECISION INST.	2- 2	2	0	0.0
O	QUANTOR CORP	3- 5	3 1/2	+ 1/8	+3.7
O	RECOGNITION EQUIP	6- 10	7 1/4	+ 1/4	+3.5
O	SCAN DATA	1- 2	1 1/8	+	+5.8
O	STORAGE TECHNOLOGY	10- 23	22 7/8	+3 1/2	+18.0
O	T BAR INC	7- 13	12 1/8	+ 5/8	+5.4
O	TALLY CORP.	4- 6	5	+ 1/2	+11.1
A	TEC INC	7- 10	7 1/8	+ 1/8	+1.7
N	TEKTRONIX INC	29- 40	35	0	0.0
N	TELEX	2- 3	3 1/8	- 1/8	-3.8
O	TESDATA SYSTEMS CP	13- 20	14	+ 1/4	+1.8
O	WILTEK INC	1- 1	5/8	+ 1/8	+25.0

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A	AMERICAN BUS FRODS	6- 8	7 3/8	+ 3/8	+5.3
O	BALTIMORE BUS FORMS	1- 4	1 7/8	0	0.0
A	BARRY WRIGHT	10- 17	16 3/4	+ 7/8	+5.5
O	CYBERMATICS INC	1- 1	7/8	0	0.0
O	DUPLEX PRODUCTS INC	14- 20	18 1/4	0	0.0
N	ENNIS BUS. FORMS	6- 9	8 1/2	- 1/4	-2.8
C	GRAPHIC CONTROLS	13- 38	38 1/8	+19 5/8	+106.0
N	3M COMPANY	45- 56	47 1/4	+ 1/4	+0.5
O	MOORE CORP LTD	24- 37	26 1/2	+ 1/2	+1.9
N	NASHUA CORP	16- 28	20 1/8	- 1/8	-0.6
O	STANDARD REGISTER	18- 25	19 3/4	- 3/4	-3.6
C	TAB PRODUCTS CO	8- 19	8	0	0.0
N	UARCO	18- 22	20	+ 1/4	+1.2
A	WABASH MAGNETICS	10- 15	10 5/8	- 3/8	-3.4
N	WALLACE BUS FORMS	17- 21	19	0	0.0

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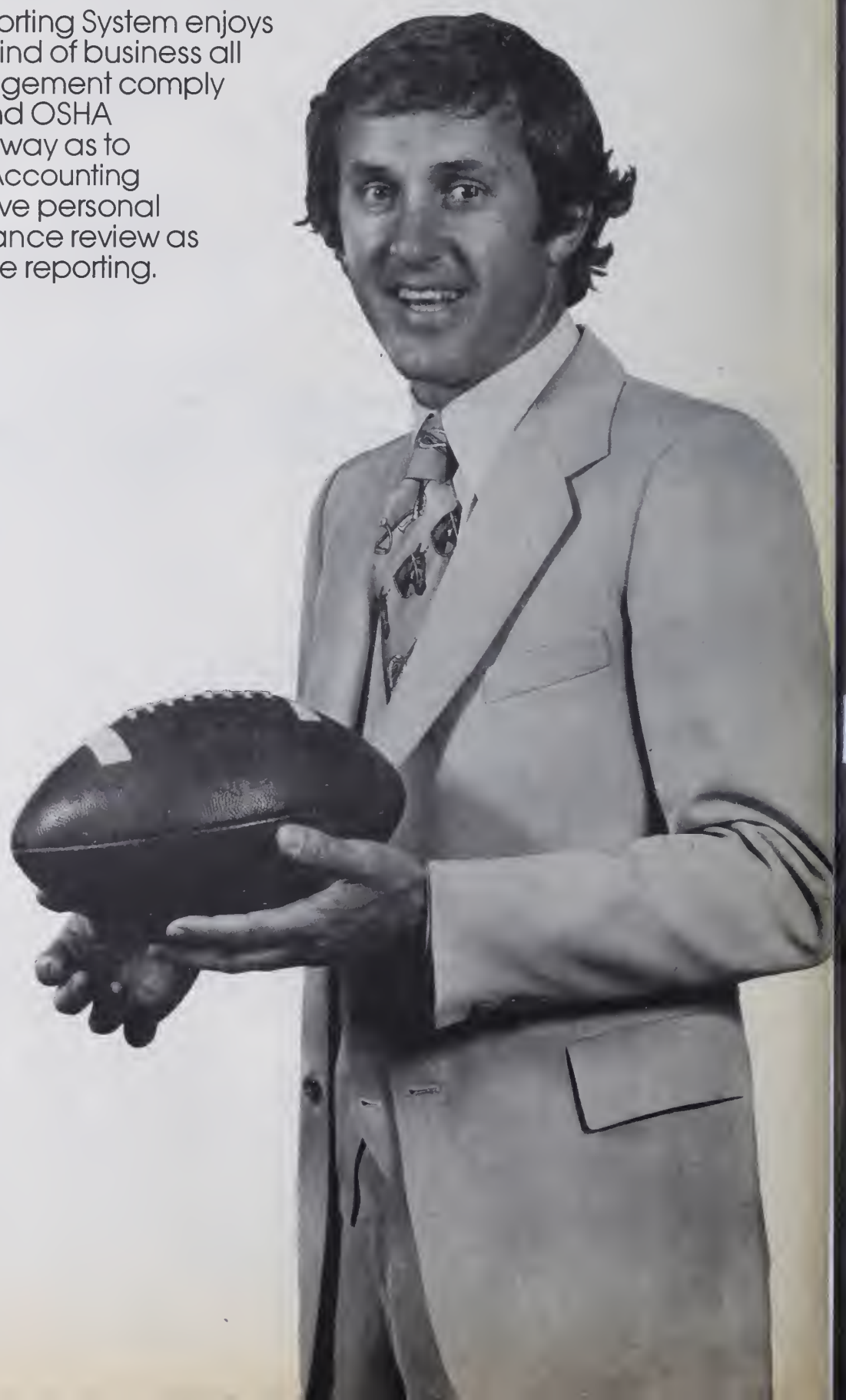

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